

A History of The North Pacific Division



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A History of The North Pacific Division

by
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for
**U. S. Army Corps of Engineers
North Pacific Division**

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AUTHOR'S PREFACE

The history of the North Pacific Division of the Army Corps of Engineers encompasses vast regions and massive projects. It includes the three western states of Oregon, Washington, and Idaho, the western watershed of Montana, and the far northwestern State of Alaska – a region unto itself. The time period moves from the era of sailing ships waiting to cross the perilous bar at the Columbia River's mouth to the present age with barges and tankers carrying hatchery fingerlings downstream past modern, multipurpose dams on the Snake and Columbia waterways. This history is not an attempt to document completely all important activities and influences of the Corps of Engineers in this part of the United States; rather I have selected those themes and projects that represent turning points or serve as examples of new policies and directions in water resource development. A comprehensive history of individual projects can be found in each district's history.

The book has two purposes. First, it describes the internal development of the Division from the creation of its first small office in San Francisco in 1901 to the establishment of a modern organization of over 400 employees housed in an impressive granite building in Portland. Second, it examines the role of the Division in the historical development of the region. It is impossible to understand Pacific Northwest history without a knowledge of the policies and activities of the Federal Government in the area and the major impact the area's abundant water resources have had in the development of shipping, hydroelectric power, and recreation. I hope this history helps in this understanding.

Viewed from one perspective, the North Pacific Division represents four districts: Portland, Seattle, Walla Walla, and Alaska. It should be noted that the Division is an administrative headquarters and that its districts are largely responsible for the numerous water resource projects in their own areas. It was not practical, nor always possible, to trace the complex relationships between each district and the Division. Moreover, the purpose of this volume is to describe how the Division, as a composite of its districts, has implemented new policies and what effects these policies have had on its projects and programs.

I am indebted to many individuals who have helped me in this project. First of all, Felix J. McLarney, Chief of the Logistics Management Office who provided overall guidance and encouragement during all stages of the book. Jerry Schmunk of the Public Affairs Office and many others in the Division assisted with personal information and interviews, and in locating records. The Public Affairs Offices and staff at each district also gave generously of their time and helped expedite my research. I am grateful to David Pfiff of the Federal Records Center in Seattle, the staff of the National Archives in Washington, D.C., and the Corps' Historical Division who greatly aided my research efforts and provided valuable comments on the manuscript.

A handwritten signature in cursive script, reading "Mary E. Reed". The signature is written in dark ink and is positioned at the bottom right of the page.

TABLE OF CONTENTS

AUTHOR'S PREFACE	i
HISTORY OF THE NORTH PACIFIC DIVISION: INTRODUCTION	1
I. EARLY NAVIGATION PROJECTS	6
1. Willamette River, Columbia River Mouth and Coastal Projects	8
2. Inland Projects	13
II. THE NATIONAL CONSERVATION MOVEMENT AND WATER RESOURCE PLANNING, 1900-1925	22
1. The Roosevelt Conservation Movement and Water Resource Legislation	24
2. The Multiple Use Concept	25
III. MAKING THE SURVEY, 1926-1932	32
1. Introduction	34
2. Work on the 308 Reports: Problems and Issues	35
3. The Two Federal Agencies in the Columbia Basin	37
4. Completing The Report and Return of Good Will	42
IV. BONNEVILLE DAM: BEGINNING THE PROJECTS	46
1. Introduction	48
2. Anticipating the Report	48
3. A Plan For The Columbia	50
4. Authorizing and Beginning the Dams	52
5. Fish Conservation and Passage	53
V. PLANNING FOR POWER: PACIFIC NORTHWEST REGIONAL PLANNING COMMISSION AND BONNEVILLE ADMINISTRATION	60
1. Introduction	62
2. Pacific Northwest Regional Planning Commission	62
3. Marketing Hydroelectric Power	64
VI. THE INLAND NAVIGATION SYSTEM	70
1. Introduction	72
2. Preliminary Investigations	72
3. The Third Dam and Regional Disputes	73
VII. FLOODS AND FLOOD CONTROL	82
1. Introduction	84

2. Floods and Flood Control Activity Before 1945	84
3. Flood Control After World War II	89
VIII. THE WAR YEARS: CONSTRUCTION AND POWER FOR DEFENSE	98
1. Introduction	100
2. Prelude to War	100
3. The Pacific Northwest at War: Seattle and Portland Districts	101
4. The War Effort in Alaska	102
5. World War II: Power and Navigation for Defense	104
IX. THE MAIN CONTROL PLAN	112
1. Introduction	114
2. Preparing the Main Control Plan	114
3. The 1948 Review Report and the Main Control Plan	117
4. Hells Canyon Dam and Interagency Agreement	120
5. The Columbia Valley Authority	121
X. AN ERA OF CONSTRUCTION, NEW ISSUES AND PROBLEMS	128
1. Introduction	130
2. The Partnership and Hydropower Development	130
3. Fish and Wildlife Conservation	133
4. Canadian Water and the International Joint Commission	138
5. Recreation: Transition to a New Age of Water Resource Uses	142
XI. ENVIRONMENTAL LEGISLATION, INTERPRETATION AND RESPONSE	148
XII. POWER, HUMAN AND CULTURAL RESOURCES	162
1. Power Needs and Basin Studies	164
2. Native Americans and Cultural Resources: New Challenges to Water Resource Projects	168
XIII. PLANNING FOR AND PROTECTING NATURAL RESOURCES	180
1. Water Quality and the Permit Program in the North Pacific Division	182
2. Fish and Wildlife Mitigation	184
3. Lower Snake River Projects and the Fish and Wildlife Compensation Plan	189
XIV. SURVEYING ALASKA'S RESOURCES, 1869-1955	198
1. Introduction	200
2. Early Engineering Works in Alaska	200

3. First Planning Efforts	204
4. Post-War Planning: Defense and the First Rivers and Harbors Comprehensive Reports	206
5. Civil Works and Comprehensive Planning	208
XV. ALASKA ENERGY AND ENVIRONMENTAL CONCERNS	216
1. Hydroelectric Projects for Alaska	218
2. Alaska Earthquake and Flood: Meeting the Emergencies	225
3. New Energy Sources and Environmental Concerns	227
EPILOGUE	237
BIBLIOGRAPHY	238
CHRONOLOGICAL LISTING OF NPD ENGINEERS	248
PHOTO CREDITS	249
INDEX	252
NOTE ABOUT THE AUTHOR	273

HISTORY OF THE NORTH PACIFIC DIVISION

Introduction

In October 1901, the North Pacific Division of the U.S. Army Corps of Engineers opened for business in San Francisco. The new division engineer, 58-year-old Colonel William Henry Heuer, and his one clerk were responsible for supervising navigation projects in the Portland, Oregon and Seattle, Washington districts. Colonel Heuer's official portrait suggests a good-natured person, his military appearance tempered by a bushy mustache, thick eyebrows, and a healthy thatch of white hair. Heuer was already familiar with the Pacific Northwest and river and harbor work. After beginning his career as a freight clerk on the Mississippi at age 16, he entered West Point, graduating in 1865 with a commission as first lieutenant in the Corps of Engineers. Assigned to California as assistant engineer on surveys, Heuer carried out several examinations of rivers in California and Oregon as well as dredging and snagging improvements on the Willamette River and blasting rocks in San Francisco Bay. During his first five-year assignment in the West, he also laid out a military road from Fort Churchill, Nevada to Boise, Idaho. After completing 16 years of service, Heuer returned to San Francisco. During the Spanish American War, he supervised construction of the harbor's submarine mine defenses. He remained in the city after the war, planning the defenses of Honolulu and Pearl Harbor and carrying out channel improvements in California.¹

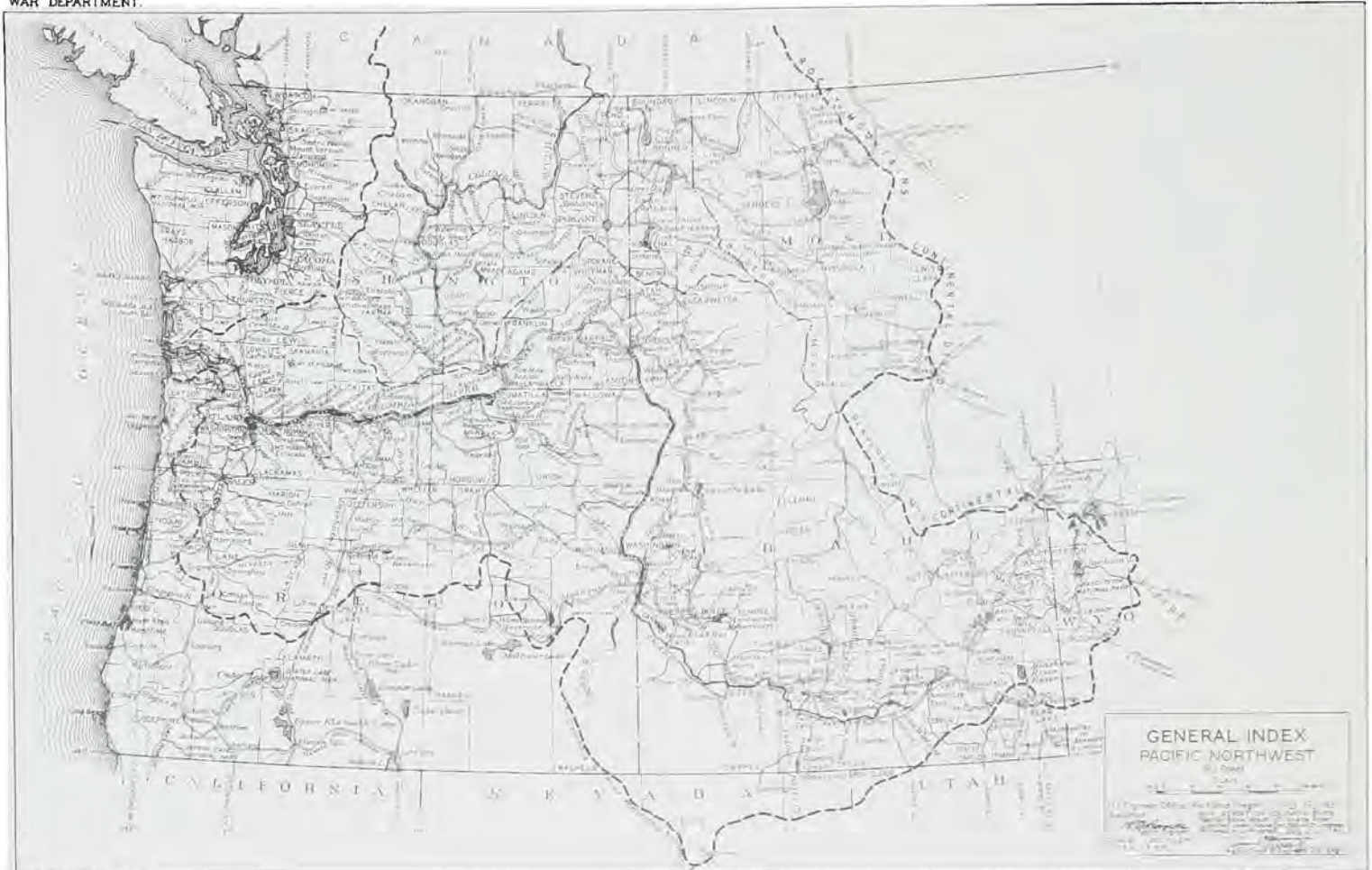
Colonel Heuer's career is an example of the survey and engineering work that helped ensure the orderly development of the West. Yet the history of most Army Engineer officers, like Heuer, remains buried in brief summaries of official reports. With notable exceptions, even the role of the Corps of Engineers and other federal agencies in this region has been neglected.² Indeed, a curious gap exists between the popular conception of how independent pioneers built the West and the almost unknown role of government officers and agencies. However, the federal government has been a willing partner in western settlement and development. The earliest national interest in the Pacific Northwest focused on the possibility of a navigable passage from the populated East to the Pacific Ocean. President Thomas Jefferson's commission of Army Captains Meriwether Lewis and William Clark to explore the Missouri River in 1804 extinguished the dream of a transcontinental waterway. Nonetheless, the success of the expedition in completing a circuit to the Pacific Ocean stimulated imaginations with the prospect of lucrative trade with Asia by a more direct, overland route. In later years government support for transportation, commerce and communications was essential in stabilizing early settlements. Army Engineers constructed forts, lighthouses and roads, and they explored and surveyed coastlines, rivers and vast interior regions. All these activities meant that individuals could live more securely, receive supplies, export surplus products on a regular basis, travel waterways with less hazard, and obtain accurate maps and scientific information. The government accelerated its involvement in public works by forming a permanent Corps of Engineers in 1802. In 1813 the War

Department added topographical engineers to the Army for the specific tasks of exploring, surveying and mapping.³

Although military activities and the extensive surveys of the topographical engineers took precedent in the early history of the U.S. Army in the West, engineering work on roads, rivers and harbors left a more permanent mark. The General Survey Act of 1824 authorized surveys, plans and estimates for roads and canals, thereby establishing a basis for the Corps' navigation work. Under this legislation, army engineers also built simple forts and roads in the West. Because of the military necessity for roads, the War Department in 1855 created the Pacific Wagon Road Office in San Francisco. After the Civil War, the War Department formed an engineer district office in that city with responsibility for supervising river and harbor surveys and improvements on the Pacific Coast. Army engineers who headed the new office were experienced in this work. The first officer in charge, Major Robert S. Williamson, had risked his life surveying railroad routes in the Southwest and in hostile Indian territory in northern California and southern Oregon. In fact, these district officers frequently served in military departments in the West as well as in the civil engineering offices. As the Corps' work increased, the War Department in 1871 divided responsibility for improvements at the California - Oregon border, creating a second office in Portland. The engineer in charge, Major Henry M. Robert, with his assistant and office clerk oversaw all work on the Willamette and Columbia rivers. Under this arrangement the senior or supervising engineer for the Pacific Coast Territory had responsibility for the Portland Office until the Pacific Division was formed in 1888. In that year five divisions were created, including the Pacific Division at San Francisco.⁴

The creation of the new divisional administrative level reflected a crisis within the Corps of Engineers. During the latter part of the 19th century work expanded without a corresponding increase in officers. Work on rivers and harbors grew from 49 projects and 26 surveys in 1866 to almost 371 projects and 135 surveys in 1882. At the same time, the number of officers actually declined. Moreover, many civil engineer assistants and senior officers were young and inexperienced. There were other reasons, too, for the lack of trained officers. New non-military engineering colleges attracted prospective engineers, and young professionals often preferred to work for private, non-military organizations. Along with problems of recruitment, the agency experienced another setback in 1877 when the U.S. Geological Survey took over the Corps' responsibility for western explorations. In 1885 some members of Congress suggested that river and harbor projects be transferred to a new department. Although this proposed legislation did not pass, the Corps quickly established the five division offices in 1888. This was a countermove to Congressional interest in establishing departments of civilian engineers throughout the country to supervise water projects.⁵

Successfully surviving this threat to its authority over navigation projects, the Corps further strengthened its administrative structure by creating the North Pacific Division



in 1901. The Division depended to a large extent on field offices to carry out the projects which had steadily increased in numbers and complexity. Because of the heavy workload in the Pacific Northwest in 1884, the Chief of Engineers had authorized a second office in Portland, and in 1896 he created a third in Seattle – splitting the territory roughly in half. In the early 20th century, engineer offices became known as district offices, with a First and Second District Office designated at Portland in 1907. This represented a change from identifying the two Portland offices in terms of their specific projects.

The new head of the North Pacific Division, Colonel Heuer, must have contemplated, with some apprehension, the geographical breadth and complexity of the territory now under his supervision. The Division encompasses 860,000 square miles, over half of which is in Alaska. This is almost 25 percent of the land area of the entire United States. Washington, most of Oregon and Idaho, western Montana, a section of northwest Wyoming, and small strips in northern California, Nevada and Utah, and Alaska comprise the North Pacific Division, the largest within the Corps. Its tidal shoreline extends 3,000 miles in Oregon and Washington and includes another 47,000 miles along Alaska's severely indented coast. The total 50,000 miles of seacoast represents 60 percent of the nation's coastline.

In studying his atlas, Colonel Heuer would have mentally organized the Division into its river systems. The region includes three of the largest rivers in the United States: the Columbia, second only to the Mississippi; the Yukon and Kuskokwim, both in Alaska. The Columbia is the major river in the Pacific Northwest. Its extent and course is difficult to envision for it follows a meandering route from its headwaters at Columbia Lake in British Columbia to the Pacific Ocean. In a journey of over 1,270 miles, it drains an area of 259,000 square miles, 229,000 of which are in the United States. It flows almost due north from its origins which is ten miles from the headwaters of a major tributary, the Kootenai, which runs just as abruptly south. On its northward journey, the Columbia passes through the valleys of the Rocky and Selkirk mountains. Then, after 200 miles, it arcs steeply southward, crossing the Canadian border after another 300 miles. At this point it is only 100 miles from its headwaters. The waters of the Kootenai, Clark Fork and Spokane Rivers swell the Columbia as it continues southward. Turning sharply west, the great river intersects the Okanagon and then turns south again, giving the name Big Bend to this part of the Columbia Basin.

In the central basin, the Wenatchee and Yakima Rivers surge into the Columbia, and at the broad plain in southeastern Washington near Pasco, the Snake glides into the

river. The former turbulence of this confluence is now stilled by a series of dams on both rivers. At Pasco, the Columbia turns once more westward through arid basalt cliffs dividing the states of Oregon and Washington. The Deschutes and John Day Rivers add to its volume. At The Dalles, the river bed begins to narrow into the spectacular gorge which the Columbia has cut through basalt rock and massive mud slides, leaving the tributary streams on the Oregon side to cascade from the cliffs in feathery waterfalls. A series of dams and reservoirs above Portland now conceal the rapids which once made portages necessary for early steamer traffic at Celilo Falls, The Dalles, and the Cascade rapids. The Willamette, the last major tributary, meets the Columbia at Portland. From just above Portland at Bonneville Dam to the mouth of the river at Astoria, ocean tides influence the river's currents and flow.

The Snake River, a major tributary of the Columbia, originates in Yellowstone National Park where it begins its 1,000 mile journey south before turning west through the arid lands of southern Idaho. Its most striking feature is Hells Canyon, a deep gorge between Idaho and Oregon that reaches a depth of 7,900 feet, forming the nation's deepest and narrowest canyon. The famed Salmon River loops north and then runs west through Idaho's massive central wilderness area before entering the Snake in this remote region. At Lewiston, the Snake meets another major tributary, the Clearwater.

The Willamette, the Columbia's second major tributary, flows through the first settled area in the Pacific Northwest. Only one-third as long as the Snake, it drains 11,200 square miles of the fertile Willamette Valley. This valley, extending north from the Calapooya Mountains to the mouth of the river at Portland, is bounded on the east by the high-peaked Cascades and on the west by the lower Coast Range.

Heuer would have studied other rivers as well. In southern Oregon several minor river systems (the largest being the Umpqua and the Rogue) flow west from the Cascades into the Pacific Ocean. Many of the coastal rivers are popular with recreationists but are navigable only for short distances. The western portion of Montana falling within the Division contains several Columbia tributaries. The Kootenai, with a volume of water comparable to the Missouri, rises in southeastern British Columbia a few miles from the Columbia's headwaters. It flows into northwest Montana, then west into North Idaho, then north again to Kootenay Lake in British Columbia, and finally into the Columbia.

The Yukon, the second largest river system in the Pacific Northwest, has twists and moods rivaling the Columbia. It drains an area roughly equivalent to the states of California, Washington, Utah and Nevada, but its importance for navigation and hydroelectric power is limited by geography and lack of population. The Yukon's headwaters are in the glaciers and snowfields of the St. Elias Mountains, and here, only 15 miles from the Pacific Ocean in British Columbia, it begins a journey of 2,300 miles before emptying into salt water. Crossing the Canadian boundary into Alaska, the river winds southwest and then north, past ghost towns and deserted mines. On Yukon Flats between the Arctic Circle and downriver, the Yukon constantly changes channels, cutting

through mudbanks, quicksand and small inlets. Then flowing west through mountains and Rampart Canyon, it joins with the Tanana, its largest tributary, and at places becomes three miles wide. Despite numerous islands and sloughs, the current is strong here. In its final northwest curve, with open tundra spreading on both sides, the Yukon passes into the Bering Sea through several shallow channels, the most important of which is Apoon Harbor.

Other major Alaskan rivers include the Kuskowim, which empties into the Bering Sea at Bethel Harbor, and the Susitna, which can be navigated for a short distance from its mouth at Cook Inlet near Anchorage. Coastal rivers like the Copper in southwest Alaska are navigable only by experienced white water enthusiasts.

Another major water system within the Division, Juan de Fuca Strait and Puget Sound, presented Heuer with a different responsibility. This vast waterway contains 1.6 million surface acres and has 2,167 miles of protected shoreline. It stretches northward from Olympia, Washington, touches the Pacific Northwest's major metropolitan area at Tacoma and Seattle, and meets the Pacific Ocean at a wide opening between Cape Flattery, Washington, on the south and Vancouver Island in British Columbia on the north. Unlike the harbors of the Oregon and Washington coasts where constant dredging and jetties are necessary for safe and regular shipping, the Strait and Sound are deep, protected channels which have required few improvements. In both early and modern times this body of sea water has supported a major shipping route to California and Asian ports.

Outside the safe harbors of Juan de Fuca Strait and Puget Sound, the Pacific Ocean belies its name, especially during winter storms. Although most ships are safe while at sea, the storms make it difficult to enter coastal harbors and rivers. The Oregon and Washington coasts have few entrances designated as refuges, although there are numerous harbors. The many small harbors set among abrupt coastal promontories with reefs and long breakers are used mostly by fishermen.

The Alaska coastline with its Aleutian archipelago forces shipping through a circuitous route. In the southeast and southwest, fishing harbors are crowded at the base of precipitous mountains; beaches and harbors in the Bering Sea and Arctic Ocean are exposed and without sufficient natural depths for even small ships. The harsh climate of fog, ice floes and arctic winds harass shipping along winding sea lanes of the inland passage in the southeast, around the Alaska Peninsula, and northeast to the oil fields in the Arctic Ocean.

In addition to this complex river and harbor system, the North Pacific Division includes the massive mountain chains of the Rockies and the Cascades. In Alaska, the southeastern panhandle with the state capital at Juneau, is almost completely isolated from the interior by rugged coastal mountains, while in the interior, the Alaska and Brooks ranges form concentric circles that parallel the southern coast.⁶ There are extreme climates and regions within the Division – mountain deserts, arctic tundra, rain forests, prairies and swampy lowlands – that have made engineering particularly challenging.

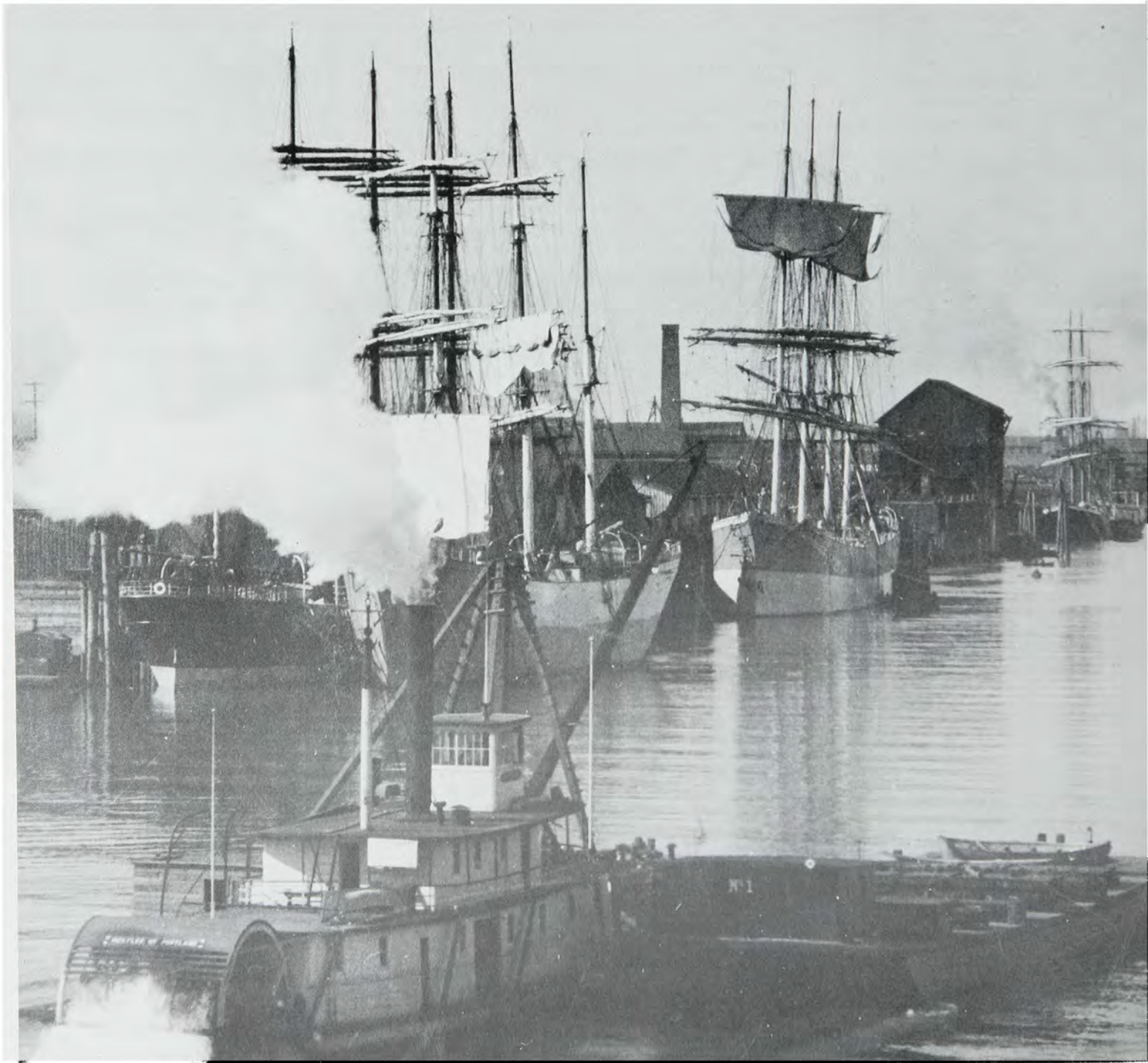
Since Colonel Heuer's time, river and harbor improvements and construction of jetties, locks and dams have transformed the Pacific Northwest. Modern tugs and barges have replaced the ships and small steamers that once braved shifting channels, tidal flats and breakers at harbor mouths to make their way upriver through rapids and shallows. Dams and reservoirs have created massive irrigation projects, significant flood control, and an abundance of hydroelectric power for the region's homes and industries. These improvements were justified on economic grounds, but other important questions surfaced in the early years which could not

be so easily resolved. Did the government have an obligation to develop waterway communications in isolated areas where future commercial patterns were still unknown? Did the undertaking of a project mean that the Corps had a responsibility to continue or maintain it even when that work had lost its economic justification? These questions, stemming from engineering projects in the last three decades of the 19th century, engendered debate and controversy over the future direction of the North Pacific Division in the Pacific Northwest. They were questions the Division inherited in 1901 and would attempt to solve in the 20th century.

Introduction - Endnotes

1. General Orders No. 11, Headquarters, Corps of Engineers, 30 Sept. 1901; Association of Graduates, U.S. Military Academy, *Annual Report*, 1925, pp. 189–190
2. For a concise history of the U.S. topographical engineers, see Frank N. Schubert, *Vanguard of Expansion: Army Engineers in the Trans-Mississippi West, 1819–1879* (Washington, D.C.: Government Printing Office, 1980). Two other valuable and more comprehensive studies are those by William H. Goetzmann, *Army Exploration in the American West, 1803–1863* (New Haven: Yale University Press, 1959), and *Exploration and Empire: The Explorer and the Scientist in the Winning of the American West* (New York: Alfred A. Knopf, 1967). For a modern history of federal agencies, see Charles McKinley, *Uncle Sam in the Pacific Northwest: Federal Management of Natural Resources in the Columbia River Valley* (Berkeley: University of California Press, 1952). There is an excellent history of the Portland District by William F. Willingham, *Army Engineers and the Development of Oregon* (Portland: U.S. Army Corps of Engineers, Portland District, 1983).
3. Schubert, *Vanguard of Expansion*, p. viii. The topographical engineers became a separate branch in 1831 but were merged with the Corps of Engineers in 1863.
4. William Stull Holt, *The Office of the Chief of Engineers of the Army: Its Non-Military History, Activities, and Organization*, *Service Monographs of the United States Government*, No. 27, Institute for Government Research (Baltimore: The Johns Hopkins Press, 1923), p. 5; Willingham, p. 16.
5. Martin Reuss, “Andrew A. Humphreys and the Development of Hydraulic Engineering: Politics and Technology in the Army Corps of Engineers, 1850–1950,” unpublished manuscript, Historical Division, Office of the Chief of Engineers, Washington, D.C., pp. 11, 23–24.
6. For an excellent description of Alaska’s unique physical characteristics, see Morgan B. Sherwood, *Exploration of Alaska: 1865–1900*, *Yale Western Americana Series*, No. 7 (New Haven: Yale University Press, 1965), especially pp. 12–13.

I EARLY NAVIGATION PROJECTS



The great country drained by the Columbia River is still in its infancy, and it is the cherished scheme of all who are alive to its best interests to see the whole river, or as much of it as is practicable, open to free navigation, and the healthful competition which would grow therefrom.

Captain Thomas William Symons,
1881



The Portland Harbor in 1899

1. Willamette River, Columbia River Mouth and Coastal Projects

At first, the Corps of Engineers concentrated much of its activity in the Northwest on the lower Columbia and Willamette rivers, particularly at Portland, the population and commercial nexus of the region. As the major trading center, the city prospered during the 1860 gold strikes in Oregon, Idaho and Montana, then found more permanent riches in the export of timber and wheat. Beginning with the fall harvest of 1867, Portland began shipping wheat directly to markets in Liverpool.

Interest in improving the Willamette and Lower Columbia rivers coincided with significant changes in river vessels. Before the time of the Civil War, the river's colorful flotilla of keelboats, canoes, rafts, barges and scows was being replaced by steamboats. Steamboat companies preferred sternwheelers which seemingly could walk by themselves off sandbars. With an increase in lucrative trade with San Francisco, a deep and safe channel was essential, especially if Portland was to remain competitive with other ports.

The first Army Engineer projects in the Pacific Northwest began on the Willamette River near Portland with dredging and snagging operations and building simple wing dams to deflect the current, scouring out a deeper channel. Because of local pressure to improve the river channels for boats of deeper draft, Willamette project depths were increased throughout the years to 20 feet in 1878, 25 feet in 1891, and 30 feet in 1910.¹

The Willamette above Oregon City also experienced a boom period from gold discoveries in southern Oregon and lumber and wheat exports to California. Export trade was limited until the introduction of sternwheelers which could navigate the shallow, twisting channels. Steamboat traffic peaked in the 1860s and 1870s, particularly after the completion of locks at Willamette Falls in 1873 opened the river to through navigation with the Columbia. After that, a lively commerce in grain, timber and livestock steamed downriver from towns and landings of the upper Willamette River to ocean going ships at Portland.

The Portland Engineer Office expressed confidence that these navigation expenditures were amply justified by the Willamette Valley's dense settlements, its numerous industries, progressive agriculture, and "natural facilities for commercial intercourse with the worlds, enhanced by the abundant and never failing resources of water power." Despite this optimism, the expansion of shipping on this part of the Willamette proved short-lived because of railroads and seasonal low water. The river was navigable above Salem only from October to August. At other times, freight had to be carried by wagon or stored until water levels rose. Boats could reach Eugene, 80 miles above Salem, only during periods of extremely high water. With periodic floods on the upper river, the channel broadened and grew more shallow. Pilots regularly updated their charts and watched for sudden changes in the river's course. Without continuous snagging and improvement, the river above Corvallis became strangled with debris and shipping points were abandoned. After 1910, commerce between Oregon City and Salem dwindled to an occasional vessel carrying freight or towing log rafts.²



The dredge *Olympia* operating on Oak Bay Canal near Port Townsend in the Juan de Fuca Straits



The snagboat *Skagit* operating in the Puget Sound area until 1915

The greatest need for federal assistance on the upper Willamette River was protection from periodic flooding on the level plains along the riverbanks. Five to ten feet of flood water frequently covered the bottomlands and cut networks of sloughs through fields. After the notorious 1861 flood, the Willamette flooded again in 1874, 1890 and 1894. Although this last flood exceeded the 1861 crest, it did less damage because residents of the valley had located their buildings on higher ground. By the early 1900s, flood control assistance had become an important issue. The Corps' involvement in constructing flood control facilities, however, would have to wait for Congressional authorization through the 1936 Flood Control Act.³

While carrying out improvements on the Willamette and the Columbia, the Portland Office also turned its attention to the mouth of the Columbia. Only a reliable, deep channel for ocean vessels could insure the continuing commercial development of the Portland area, particularly in view of the natural deep-water harbors on Puget Sound. One of the most expensive and lengthiest 19th-century engineering projects in the Pacific Northwest, the jetties at the mouth of the Columbia protected the competitive status of Columbia River ports. Without them, the region would have assumed an entirely different character. The era's larger, more economical ships and their trade would have bypassed the river's narrow, shallow channel.

The mouth of the Columbia River is a tidal estuary stretching six miles between low, sandy Point Adams on the Oregon side and Washington's rocky promontory, Cape Disappointment. The construction of the jetties extended over 49 years, from 1884 to 1933. The work strained the patience,

perseverance, and skill of the Army Engineers, and it illustrated the underlying problem in river and harbor work in the Pacific Northwest: lacking a central planning system to analyze competing projects and make recommendations based on usefulness, need and available funds, Congress frequently voted appropriations in response to a particular interest or pressure group.

Of all the problems encountered with building the two jetties, insufficient appropriations proved more troublesome than winter storms or the shipworm, the teredo, which honeycombed the wooden pilings of the jetty tramway. Begun cautiously in 1885, the work frequently stalled. Finally, in 1890 local business interests intervened, convincing Congress to approve sufficient funds to complete the south jetty.⁴

The formal completion of the south jetty in 1896 marked only one stage of the project. The channel progressively deteriorated after that until in 1902 it was only 27 feet deep at low water. Again, political pressure brought results. Oregon Senator John Mitchell, prodded by a telegram from the editor of the Portland *Morning Oregonian*, wrote to Brigadier General George L. Gillespie, who had supervised the project in 1879 as head of the Portland Office. Mitchell stated he was "earnestly hoping the money to improve the Columbia River would be expedited." Gillespie responded by recommending that Secretary of War Elihu Root appoint a special board of engineers to investigate a proposal by Major William C. Langfitt in Portland for a three-mile extension of the jetty.⁵

Although a special board was formed, its delay in reporting frustrated commercial interests who feared that deteriorating channel depths would divert the immense trans-Pacific steamers to other ports. The local Army Engineer Office occupied a pivotal point in these affairs because of its accessibility and its professional and personal interest in the region's development. Major Langfitt, aware of the present and potential harm to shippers, fretted in a letter to Gillespie that the board's slow action could make it impossible to undertake any work that year. Winter storms had battered and flattened the jetty, and the rotting tramway had cost \$90,000 to repair. Consequently, ships had been delayed from one to two months at the Columbia's mouth.⁶

The problem lay with an inefficient system that could not rationally plan the initiation and completion of projects on a regional scale. In 1905, for example, Lt. Colonel Solomon Roessler asked for an emergency appropriation of \$400,000 to strengthen the south jetty trestle. The request infuriated Representative Theodore E. Burton, Chairman of the House Committee on Rivers and Harbors. After Oregon Senator Charles Fulton visited his office attempting to win his support for these special funds, Burton complained to the Chief of Engineers. "The fact is, the people there are very much to blame. I told them distinctly they could not have an ample appropriation both for the mouth of the river and for The Dalles, but they insisted on having both."⁷

Division Engineer Colonel Heuer pressed Roessler's request for funds to avert destruction of the trestle. Roessler's report, with photographs showing the destruction of the teredo, won Burton's grudging support for an appropriation. Nonetheless, he chastised the local senators and representatives who had advocated funds for two large projects despite his warning. "It was easy to see at that time," he stated to Secretary of War Taft, "that there would be serious detriment to the work if a larger amount was not appropriated."⁸



Pile driving for tramway jetties

The lack of planning and coordination among different interest groups hindered projects, like the Columbia River jetties, more than any other factor. The protracted history of the jetties primarily resulted from too many projects competing for limited funds and not from lack of support for improvement of the Columbia River mouth. As Oregon Senator George Chamberlain, Chairman of the Committee on Military Affairs, noted in 1917, "In all of the objections that have been made to rivers and harbors' bills in the past by Senators and Representatives who have been wont to denounce the 'pork barrel system,' no one has suggested the impropriety of large appropriations for the mouth of the Columbia River."⁹

The Columbia River bar was not the only impediment to the development of coastal and international trade to and from Pacific Northwest ports. Shallow harbors with barred entrances, narrow, rock-filled coastal rivers, and severe storms with heavy seas and winds along the rugged coastline discouraged development of Pacific Northwest coastal trading centers. Major Henry M. Robert of the Portland Engineer Office noted after an 1873 survey, "there is not a single harbor [between San Francisco and the Straits of Juan de Fuca] that can be entered during a southerly gale."¹⁰



Building the jetty at Coos Bay

The rich agricultural valleys behind Oregon's coastal mountains, deposits of coal and dense stands of timber at the edges of harbors, and the inevitable growth of the region focused Congressional attention on the need for improving these rivers and harbors and protecting ships sailing along the coast. Oregon's coastal towns vigorously sought federal funds to develop their harbors and rivers and open up trade with the hinterlands. A coastal survey by the Board of Engineers of the Pacific Coast in the 1870s for the purpose of establishing a harbor of refuge created great excitement among these communities. The coastal towns, cut off from the interior by the rugged mountains, depended on small and infrequent steamers, canoes, rowboats and crude roads for supplies. Although many towns were located at the mouths of rivers, almost all these streams were unnavigable for any appreciable length, and the entrances to the harbors or the river mouths were shallow and dangerous.¹¹

With modes and patterns of trade in the Pacific Northwest still relatively flexible, a government project could bring prosperity and permanence to one trade area at the expense of a rival. Wallis Nash, a traveler through Oregon in 1877, noted with amusement how each little settlement along the coast believed that "Portland is nothing to the city which is in course of formation." The citizens of Junction City, Oregon, boosted their candidate for federal development as a harbor of refuge, Cape Foulweather, as completely overshadowing competing claims because it was the "natural pathway to the sea" for the central Willamette Valley, eastern Oregon, eastern Washington, and even Idaho.¹²

Frank H. West, a supervisor of locks at Lynn City, Oregon, and former assistant to Major Robert, argued that, in view of limited funds and the intense competition for projects, a planning mechanism should supersede local interests. He urged Pacific Coast interests to unite behind a harbor of refuge that would provide the greatest good to those engaged in coastal trade. West explained that this cooperation would

empower Congressional delegations from the region to secure adequate appropriations each year to finish the work. He clearly articulated the disadvantages of keying federal projects to narrow local interests. "It seems to me," he wrote to the Portland *Oregonian* editor, "that none of the letters I have read [supporting sites for a harbor of refuge] take that broad and comprehensive view of the subject which a great national work costing millions demands and in which the merchants, shipowners, underwriters, seamen, not only of this coast but of every commercial city of the world, have more or less interest."¹³

Surveys and reports elicited by the harbor of refuge investigations coincided with plans for improving harbors and river mouths along the North Pacific coast. Although the claims of each area were similar, some locations appeared more deserving of assistance than others. Yaquina Harbor where Engineers began building a south jetty in 1880, was directly west of Corvallis, the head of navigation on the Willamette River. In 1884 a railroad linked towns along Yaquina Harbor and Elk Creek to Corvallis, Albany and logging enterprises in the Cascade Mountains, adding weight to the argument for improving the harbor. The directors of the short line Oregon Pacific Railroad hoped that the Corps would cooperate by improving the harbor where their steamers could transfer cargo from the rails. The Engineers completed the jetties in 1896, but efforts to develop a vigorous trade eastward through Corvallis proved disappointing. In 1891 Captain Thomas Symons noted that only one boat traded to San Francisco, and no sailing vessels had entered the harbor that year. The harbor area itself contained no products of importance: fires had destroyed the forests, and businesses supplied only local needs.¹⁴

In contrast to Yaquina Harbor, rich coal beds and timber resources made Coos Bay in southern Oregon the most important shipping port on the Oregon coast by the 1890s. The construction of two jetties at the south and north entrances to the Bay in 1889-1899 kept pace with expanding local industry. Large sawmills and a shipbuilding trade encouraged and increased commerce. The ability of Coos Bay to compete favorably with more advantageously located shipping points was, in Captain Symons' estimation, a full recompense for government expenditures.¹⁵

Expenditures for the harbor projects along the Oregon coast were amply justified by the amount of commerce they generated, with the possible exception of those for Yaquina Bay. In the interior, enthusiasm for improvements greatly exceeded the commercial or social benefits. Promoters of the Umpqua and Rogue rivers sought federal assistance despite questionable benefits. Both rivers drained fertile but sparsely settled valleys in southern Oregon, and local interests hoped to encourage growth with an east-west waterway to the ocean. They believed that the two rivers, if navigable, would attract trade from the established overland route to San Francisco, benefiting Oregon and, particularly, Portland. Supporters of improving the Umpqua succeeded in securing a survey of the river from Scottsburg, the head of navigation, to Roseburg. The Umpqua River's claims to navigability were based on the single trip of a small sternwheeler with a 31-inch draft which had travelled 120 miles upriver from Scottsburg to Roseburg in six days. When Army Engineers Major Robert S. Williamson and Lieutenant William Heuer arrived in 1871 to survey the river, they were unable to find a boat or even a skiff to carry them down river. They had to settle for a hired wagon which stopped for observations wherever the river was accessible.

Later, Williamson recommended \$22,500 to improve four of the rapids, but his successor, Major Henry Robert, sharply disagreed. After Robert and his assistant Frank West made their own inspection in October 1871, Robert reported to the Chief of Engineers, "after the descent I was no longer surprised at our inability to learn of anyone who had ever been all the way down the river in low water, for it was a succession of rapids and falls." As for the money already spent, "no improvement of this river should have been attempted." Nevertheless, Congress bowed to the wishes of Oregon's Congressmen and appropriated \$39,501 from 1888 to 1896.¹⁶

On the other hand, an examination of the Rogue River, under Major George L. Gillespie, squelched the possibility of expending any funds on one of the least navigable rivers in Oregon. Gillespie's assistant engineer, Philip G. Eastwick, reported in 1878 that the river was filled with boulders, shoals, rapids, and abrupt falls, and it was choked at places with debris from hydraulic mining operations. Eastwick also pronounced the small Gold Beach harbor at the river's mouth, with its narrow, crooked bar channel, unsuitable for improvement.¹⁷

Although an east-west movement of trade from the interior valleys of western Oregon to the Pacific did not develop along the rivers south of the Columbia, the improvements to harbors and river mouths did open up the state's coastal resources to regional, national and international trade. As elsewhere in the West, railroads provided the most efficient and competitive method of moving passengers and supplies through the valleys to the main trading centers. If engineering projects in Oregon demonstrated a lack of planning and coordination, the era of surveys and initiation of projects did probe the question of how trade and communication patterns would develop. Thus, the oldest settled part of the Pacific Northwest, the Willamette Valley, abandoned navigation in favor of railroads, while Coos Bay and the mouth of the Columbia prospered under the timely expenditure of federal funds for jetties and dredges.

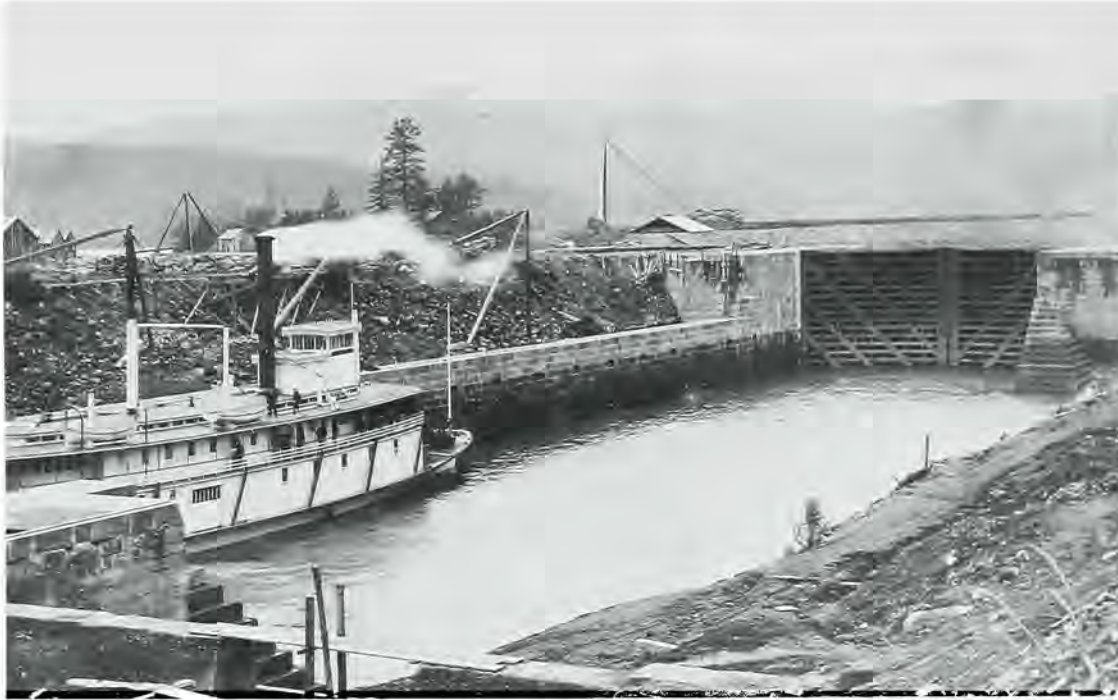
North of Oregon, the Army Engineers' work on harbors, tributary rivers, and channels inside Puget Sound was shaped by topography, patterns of settlement and communications, and the slower growth of the region. Oregon became a state in 1859 while Washington waited until 1889. In the early 1870s, Portland was a substantial metropolis of 10,000; Seattle was a mere village of around 1,200, "surrounded by dense forests transversed by few wagon roads and trails." The largest city in Washington Territory, Walla Walla, had 3,500 people in 1876 and served as the principal supply point for the Idaho and eastern Oregon mines. Until the completion of the Northern Pacific Railroad over the Cascade Mountains in 1887, agricultural products flowed down the Columbia to Portland. With transcontinental service to Tacoma and Seattle and the completion of the Great Northern line in 1893, these cities became Portland's rivals. The discovery of gold in the Klondike in 1897 ignited a shipping and trade boom in Puget Sound, especially in Seattle, which served as the miners' outfitting center. However, federal expenditures in Washington lagged considerably behind funds spent in Oregon. Some even attributed the movement for Washington and Idaho statehood as a partial reaction against the disproportionate amount spent on river and harbor work in the two areas. Between 1860 and 1888, the states of California and Oregon received \$1,492,428 and \$649,305 respectively, while Washington Territory received only \$10,000 and Idaho \$4,500.¹⁸



Lake Washington Ship Canal and the Hiram M. Chittenden Locks in 1976.

Washington's coast was less formidable than Oregon's. The two major harbors, Willapa Bay (originally known as Shoalwater Bay) and Grays Harbor were considerably more accessible to boats. Willapa is the largest bay on the western coast of the United States. Over 20 miles long and 10 miles wide, in 1897 it had a depth of 21 feet at low water over the mouth, sufficient for the coasting vessels of that time. Grays Harbor, 14 miles north of Willapa and 46 miles north of the Columbia is somewhat smaller, but still larger than any harbor in Oregon. At both places, low tides exposed over half of the harbor but left enough water for navigation and anchorage of 19th-century vessels. Engineering projects at Willapa Bay and Grays Harbor were keyed to the growing lumber industry that attracted immigrants to these isolated areas. During these years of settlement in the Pacific Northwest, Army Engineers sympathized with the exertions of the "hardy pioneers" and supported federal efforts to maintain the rivers by which they received supplies and transported products to market. Captain Symons' engineer assistant, Robert A. Habersham, shared Symons' praise for the settlers and described their homes as showing "thrift, comfort, and even a superabundance of what may be called the substantial luxuries, the products of their farms, gardens and dairies."¹⁹

Army Engineers' efforts to improve the harbors, which included construction of a north and south jetty at Grays Harbor and dredging the approaches to Willapa River, fell behind advances in the shipping industry. Larger ships began trading on the North Pacific coast, especially after completion



The completed
Cascades Canal

of the Panama Canal in 1914. While local businesses from Grays Harbor petitioned their congressmen, the shipping industries warned the City of Raymond on the Willapa River that in view of the competition for Panama Canal trade, it must improve its harbor facilities: "To be in the swim, you must be prepared to take care of these big steamers."²⁰

The Grays Harbor petitioners raised an important issue: the role and responsibility of the government in the commercial development of a region. All along the coast and on the Columbia River and its tributaries, expenditures for snagging and dredging, and for dike and jetty construction significantly aided in increasing trade and population during the settlement period. Later, with the advent of railroads and good roads, many communities relied less, or not at all, on rivers for their business and transportation. Willapa Bay, Grays Harbor, the mouth of the Columbia River up to Portland, and many Oregon coastal ports competed keenly for the transoceanic trade. Because the government had demonstrated its interest in improving the harbor and river facilities of these two states, should that not become a permanent commitment? But, if so, would not other towns and commercial groups like those at Grays Harbor assume that they were equally deserving?

A letter of April 22, 1914, from the "commercial bodies of Gray's Harbor", in reply to the Board of Engineers' solicitation of statements on harbor improvements, stated the case quite succinctly. The letter summarized the efforts of the petitioners and their friends in investing many millions of dollars in manufacturing plants, logging roads, water courses for log rafts, and dams. They had built four important towns and encouraged settlement while providing a shipping point for thousands living in tributary counties. "We believe it is up to the Nation to keep faith with its petitioners who have made these extensive . . . investments and to see to it that its harbor entrance is improved to the extent of a 24-foot channel." Without such a channel, logs would be shipped to other ports

where deep-sea vessels could reach them, to the ultimate loss of the small landowners.²¹

The Corps of Engineers assisted in making the Oregon and Washington harbors competitive with the deep ports at San Francisco and Puget Sound. At Grays Harbor that investment spurred the development of 30 sawmills and milling plants, 60 shingle mills, shipbuilding companies, several large machine shops, fish canneries, and the only whaling station in the United States. Should the government continue its commitment to the continuing prosperity of this nucleus of trade and commerce? If not, could state and local bodies like the Port District organized at Grays Harbor continue deepening the channel and dredging accumulated sand and debris by themselves?²²

The Corps learned through its activities in the Pacific Northwest that projects planned for anticipated conditions were often thwarted by unexpected difficulties and by changes in transportation modes and sizes of carriers. One partial remedy adopted on a national scale was to require financial participation by local authorities. This would increase the potential funding sources and help insure that projects would be completed. This cooperation also implied that local bodies would have to establish priorities and share the responsibility of deciding which projects were worth the investment. For example, Major James B. Cavanaugh, Engineer Officer at Portland, counseled the Grays Harbor Port Commission to inform him of their contemplated work, the extent of their resources, and the assistance they could offer in extending the north jetty. Reminding them of the general adoption of the policy of cooperation which had been applied to Oregon coastal projects, he remarked, "it is hardly necessary to state that cooperation is one of the strongest arguments with Congress for undertaking works of improvement."²³

Unlike the two other Washington harbors, Puget Sound's deep waters provided easy access and safe anchorage for the largest ships. The first priority of the Army Engineers was to

keep the Sound's tributary rivers open and free of snags for the export of lumber and for trade and communications with settlements upriver. The second pressing need was to improve shipping channels and approaches to ports along the Sound, especially those fronted by mud flats. The third assignment entailed prolonged negotiations and planning to construct a canal and locks connecting two freshwater lakes, Union and Washington, with Elliot Bay on Puget Sound.

Unlike other harbor projects in the Pacific Northwest, the Lake Washington Ship Canal did not promote safety of life and property nor was it essential for the preservation of Seattle's status as a port for ocean-going vessels. The numerous reasons advanced for the project during its long gestation pointed to the city's desire to gain a competitive edge over other deep water ports on the Pacific Coast. One significant advantage of the project was that fresh water of Lake Union would clean ship hulls of barnacles and other salt water pests without the expense of drydocking. The canal work was completed in 1916. The 100-mile increase in waterfront, realized with the addition of the two lakes, singled out Seattle as the leading port in the Pacific Northwest, one which required no dredging and little maintenance.

2. Inland Projects

The several projects undertaken in the western part of the North Pacific Division's territory shared a common theme of commercial development and communication among new settlements, towns and cities. Moreover, each project was, to a large extent, independent of the others. In the eastern interior areas, navigation projects were closely interconnected by a common desire for an open river system from Portland to towns on the upper Columbia River and along the Snake River to Lewiston.

Before the advent of railroads in the early 1880s, inland producers and shippers relied on the Columbia and Snake systems for supplies and export trade. However, expensive and time-consuming portages around Cascades rapids and the stretch of the Columbia from The Dalles to Celilo Falls offset the advantages of the long waterway. Above Celilo, low water, dangerous rocks, and reefs excluded larger steamers and made navigation impossible or dangerous during low water. The completion of railroad lines from the interior to ports at Puget Sound and on the lower Columbia River shifted the bulk of traffic from the river. Even then, farmers and merchants campaigned for an open river as a means of forcing railroads to reduce rates.

The prospect of linking the region's commercial development with the great water system of the Columbia captured the attention of many westerners. Army Engineers were no exception, and their involvement in navigation improvements gave them a special interest in the potential of an inland waterway in the Pacific Northwest. The 1881 survey by Captain Thomas Symons epitomized this practical vision of the region and its rivers. It also bridged the days of the famous topographical explorations and the modern period of more routine and relatively uneventful studies that usually elaborated on information previously collected. Although few parts of the Pacific Northwest were completely unexplored or uncharted, substantial areas still existed as blank spaces when Captain Symons compiled a map for the Department of the Columbia in 1880. This was one year before he embarked on a survey of the Columbia River from the Little Dalles, 15 miles south of the Canadian border, to Ainsworth at the mouth of the Snake

River. Symons remarked that there were hundreds of square miles of comparatively unknown territory, and "what little is known is of the most inaccurate and untrustworthy character, and that which is put upon the maps is largely hypothetical."²⁴

The Symons report is an interesting and valuable document in many respects. Beyond its contribution as a historical source about a thinly populated and relatively unknown portion of the Pacific Northwest in 1880, it was the first detailed description of the upper Columbia River and contained its first accurate maps. The possibility of extending navigation up the river captured Symons' imagination. In 1875 the Portland Office, under Major Nathaniel Michler, surveyed both the Cascades and The Dalles rapids upstream to Celilo to determine the feasibility of canals and locks at both locations. In 1878 the Engineers began the ambitious project of a canal and locks at the Cascades. Symons emphasized the importance of these improvements on the middle Columbia River by which the government would confer the most decided and lasting benefit upon people in this "great grain belt" of the Columbia Basin. He contended that similar benefits would be reaped by improving Priest Rapids, opening the river to navigation for 42 additional miles, and by clearing obstructions farther upstream to the mouths of the Okanogan, Wenatchee and Entiat rivers. He described the Wenatchee country as possessing valleys suitable for agriculture and grazing with its bunchgrass prairies and rolling timberlands. For the region farther east, Symons foresaw great benefits from the Walla Walla grain and the mineral resources which boats would bring to tidewater on Columbia ports.²⁵

While promoting the cause of water transportation at a time of rapid extension of railroad lines, Symons was aware that the importance of rivers declined as that of railroads increased. Nonetheless, he maintained that waterways were essential for the "full and complete development of slow freight and surplus productions;" and, more important, they served as a "regulator upon all of the internal commerce of the country." This was, he believed, a value which could not be overestimated and one which the government had wisely recognized in the opening up and improvement of rivers throughout the country.²⁶

Symons unequivocally advocated full government support for improving navigation on the Columbia River, describing this as "a cherished scheme of all who are alive." He appealed directly for Congressional support of these areas of "great and sure promise of a prompt and rich return," and added, "Our legislators should look upon it with liberal eyes and grant abundant aid to all desirable works of public improvement" to facilitate transportation. "Commerce will require it, the people will demand it, and it must be done sooner or later." As the first attempt to understand and interpret the Columbia Basin as an integrated system, Symons' analysis anticipated the era of open navigation on the Columbia and the lower Snake rivers.²⁷

The first two stages in the inland waterway envisioned by Symons and others were the Cascades Canal and Locks and a series of canals and locks through the rapids between The Dalles and Celilo. From today's perspective of an efficient and modern network of railroads and highways throughout the region, these projects appear superfluous and poorly planned. Even in the 1880s when these two projects were planned or under construction, intensive efforts to improve navigation were occurring throughout the country despite the rapid decline of steamboat traffic. In fact, one of the strongest arguments for canals and locks on the Columbia was to create an alternative to railroads. The monopoly of the Oregon

Railway and Navigation Company (the O.R. & N.), which controlled the rights-of-way for portages around these obstacles and consequently the freight rates, fueled demands for navigation improvements. In addition to high freight rates, costs of transshipping cargoes from boat to rail and back to boat at the two portages further increased shipping costs. In the last decades of the 19th century, therefore, these two projects, when viewed as part of the scheme to create open navigation from Lewiston to the sea, appeared sensible and complementary to the expanding railroad network. And, in fact, the completion of the Cascades Canal and Locks in 1896 did bring about a significant rate reduction by the O.R. & N. Co., a fact that seemed to justify the government's intervention.²⁸

The Cascades project, like the massive improvement at the mouth of the Columbia River, revealed several problems confronting the Army Engineers. Among these was the lack of adequate data and experience in working on the Columbia River with its numerous rapids, floods, currents, and enormous volume. Further, despite agreement within the Corps that the project should be undertaken, the Portland Engineer officers and the Board of Engineers disagreed on the execution. This lack of coordination in planning efforts and inadequate appropriations slowed work at crucial points. The public, who had expected rapid construction and completion became increasingly impatient with the slow rate of progress.

The Cascades project focused attention on the desire of an open river from Lewiston and the upper valleys of north central Washington to the Pacific Ocean. This plan required numerous and difficult improvements, including canals and locks, and the use of scows, blasting powder and dredges to clear river channels of the most dangerous rocks. In the enthusiasm for unobstructed navigation along the Columbia and its tributaries, the public, Congress and the Corps raised important questions as to how far to extend the improvements, what the benefits would be, and which groups would gain from such expensive and laborious endeavors.

Although construction began at the Cascades rapids in December 1876, the project floundered through an abrogated contract, erroneous data on low water, a flood in 1879 which threatened the excavation, and alterations to the initial plan. Even during the first stages of construction, the Engineers at Portland and the Board of Engineers for the Pacific Coast turned their attention farther upstream to the dangerous rapids above The Dalles. The Board was convinced that The Dalles-Celilo project must be built as improvements at the Cascades would be of little advantage without the second canal. However, Major George L. Gillespie, who supervised the Cascades project in 1880, expressed his misgivings about undertaking yet another protracted and expensive enterprise at The Dalles. Pointing to the 25 miles of difficult rapids on the middle Columbia River, he remarked that some persons of information and intelligence thought that the improvement was not needed at all, believing the money should be applied elsewhere. He optimistically noted that there were also those who stated with equal earnestness that the improvement would be an inestimable boom to the entire country east of the Cascades.²⁹

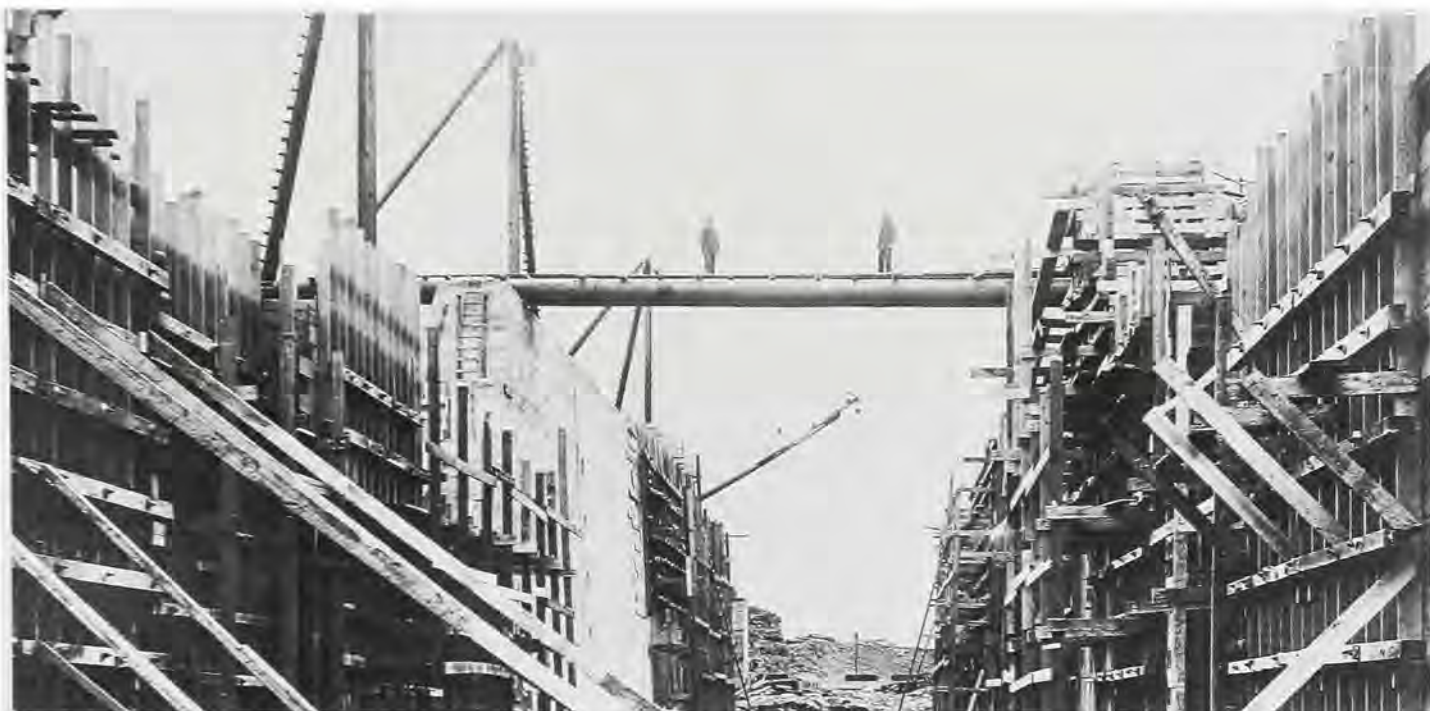
Work on the Cascades project continued for the next 16 years, provoking criticism and suspicion that using hired labor instead of contracts was the primary cause for inefficiency and waste of public money. The bitter criticism directed against

Construction of the five-mile
lock in the Dalles-Celilo canal.
December 1913

the Corps ended a period marked by general support for the Army Engineers. One newspaper even threatened the political career of Oregon Congressman Mr. Binger Hermann. The Dalles *Daily Chronicle* warned in January 1891 that if the work at the Cascades Locks was not taken from the hands of the War Department, let by contract, and completed or in a fair way to be so by June 1892, Mr. Hermann would not be reelected. It contended that of the \$35,000 presently on hand, no honest or earnest effort was being made to expend it profitably. "Money may come and go," the newspaper expounded, "but the yawning chasm at the Cascades gapes to heaven in vain, for the near waters of the Columbia."³⁰

The efficient Major Thomas H. Handbury, who had brought order to the work at the mouth of the Columbia River, defended the Army Engineers with data showing that small annual allotments were to blame for the delays. Another cause was the lack of data. In response to the charges of inefficiency, Handbury stated that he could find no records of any plans or prices of labor and materials used in making previous estimates. The data was missing. "The then prevailing notions concerning the geology of the land over which the canal with its locks was to be constructed and the engineering difficulties to be encountered," he stated, "have been proved by subsequent developments to be entirely erroneous." Despite Handbury's vigorous defense of the Corps' ability to manage the construction with hired labor, Congress stipulated in its next appropriation of July 1892 that all work and materials be obtained by contract.³¹

Despite the problems, the project was completed and the Portland *Oregonian* hailed the opening of the locks on November 5, 1896 as an epoch in the history of the State of Oregon. As thousands from Portland, The Dalles, and neighboring communities watched, Oregon's governor gave a short address and presented the steel lever for the gates to Captain Walter L. Fisk, Portland Engineer Officer. Then, with a shrill whistle from the small steamer *Sadie B*, a brass band



playing an inspiring air, and a salute fired by Battery A of Portland – all accompanied by the cheers of onlookers – the waiting boats steamed through the locks, three heading upriver to The Dalles for continued celebration there.

“Waking from her dream of twenty years,” The Dalles furnished a properly festive atmosphere for the unbounded enthusiasm of 10,000 people. There was ample reason for this happiness as the opening of the Columbia River at the Cascades inspired “confidence in a greater future of The Dalles.” With past grievances forgiven, the crowd, according to the *Oregonian* reporter, freely expressed their gratitude for the “generosity of the National Government.”³²

Despite the optimism of the celebrants at The Dalles, some Engineer officers expressed reservations about the benefits of a second canal at that site. With the completion of direct railroad connections to Portland, river traffic had almost disappeared above this point. In 1888 and again in 1892, two engineer boards reported unfavorably on prospects for resumption of navigation above Celilo through the rapids. In 1895, Pacific Division Engineer Colonel George H. Mendell pessimistically reported that several factors in the 1888 and 1892 reports argued against the feasibility of navigation on the upper Columbia and the lower Snake. In addition to the existence of many rapids, there was no fuel for steamers in the dry interior, and productive agricultural country was 20 to 30 miles from the river. Most important, no survey had been made to determine the extent to which the rapids could be improved and what the cost would be.³³

When Congress decided to pursue the project despite the negative board reviews, the Engineers’ task was to determine the most feasible engineering solution, keeping costs uppermost in mind. The Corps briefly considered constructing two boat railways to bypass the worst rapids.³⁴ Because cargoes would not have to be reloaded, the advantages over another proposal, a government-owned portage railroad, seemed considerable. The Engineers wanted to avoid the costs and

difficulties of another canal and locks project because of their experiences at the Cascades. For a time it seemed that the Pacific Northwest would have this innovative boat railway, but commercial interests and steamboat men did not support the scheme. One of the most powerful coalitions in the region, the Portland Chamber of Commerce, applauded the recommendation of Portland Engineer Captain William W. Harts to abandon the railway, “new, untried, and wholly experimental”, in favor of the canal and locks system which was “old, well-tried, and gives assurance of being safe, sure and efficient.”³⁵

Colonel Heuer intervened in 1902 in his capacity as a senior member of a board of engineers convened to examine The Dalles–Celilo project, rather than as Division Engineer. After surveying the site and examining maps, reports and other information in the Portland Office, Heuer found that much important data was lacking. Hoping to avoid the embarrassment of inadequate data that had complicated work at the Cascades, he instructed Captain William C. Langfitt in Portland to conduct specific surveys and make estimates, and then wrote to the Chief’s Office requesting that funds from the appropriation be used for this purpose.³⁶

Three months later, Heuer interceded again for the Division, this time piqued at being excluded from deliberations of The Dalles Board of Engineers which had met in New York without him. From his San Francisco office, Heuer sharply criticized this action: “I am unable to understand how four members of The Dalles Board could be in session in New York, on matters connected with The Dalles–Celilo Canal, without an order from the Chief of Engineers reconvening the Board, and of which no notification has reached me.” As senior member of the board, Heuer was understandably displeased.³⁷

The fate of The Dalles–Celilo project wavered between the Engineers’ reluctance to undertake the boat railway system and uncertainty as to the future of river commerce upstream.



Rock Island Rapids on
the Upper Columbia
river, 1892

In the meantime, inland residents continued to believe that the project would revive navigation and reduce shipping costs. In 1904 grain producers and buyers helped pressure Congress to appropriate money for a single eight and one-half mile canal with four locks between Celilo and Big Eddy rapids, four miles above The Dalles. With such strong local support, the canal was undertaken. Construction proceeded rapidly, and the project was completed in 1915. At the opening of the canal, the *Spokane Spokesman-Review* optimistically reported a bright future for the canal: "Boat companies are now arranging through traffic schedules to Lewiston and regular service is to commence at once. Rivermen express no doubt that there will be plenty of boat freight despite the fact that both rivers are lined with railroads on both sides." Yet, this project did not revitalize shipping down the Columbia, at least not in the familiar form of sternwheelers. The opening of the long canal and locks turned out to be a "false sign and ineffective agent." The railroads that transected the farming areas and stopped at marketing points along the rail lines were in control of transportation by 1915. Even though the canal forced the railroads to moderate their rates, most cargo still moved by rail. The last steamboat company above The Dalles suspended service in 1920, leaving the commerce of the canal to irregular and local traffic. In 1925 there were only 21 "passages," none with passengers, and by 1930 the passages had dwindled to a few launches and rowboats carrying 16 passengers and no freight.³⁸

The Cascades Canal and Locks enjoyed a longer period of usefulness with over 26,000 tons passing downstream in fiscal year 1906. But in June 1923, regular boat service was suspended as trucks and busses sped passengers and freight between Portland and The Dalles. Logging above the Cascades Canal briefly revived boat traffic, and convoys of log rafts in the late 1920s accounted for nearly all tonnage going through this facility. Some hoped that tow boats and barges

that used less fuel than steamboats could revive river traffic at both the Cascades and The Dalles.³⁹

The opening of The Dalles-Celilo Canal in 1915 also marked a change from the attitudes of the 1880s as expressed in Captain Symons' report. Symons had described a region stretching east into Idaho and Montana soon to be populated with farms and towns, intersected with railroads, and supporting a vast commerce from the sea to the interior. He believed that much of this commerce would move downstream from Grand Rapids, above the mouth of the Spokane River, to the mouth of the Columbia. Congressmen and business groups like the Portland Chamber of Commerce had helped ensure the construction of massive projects at the mouth of the Columbia, the Cascades and The Dalles. But the jetties, canals and locks did not completely free the Columbia of rocks and rapids. Instead, the work had determined the practical and very definite limits to these types of engineering projects. Dangerous rapids, rocks, and shallows still hampered navigation above the new canal. The expectation that the difficult rapids of the upper Columbia and the middle Snake through Hells Canyon, and in the Clearwater River in north central Idaho could be tamed by scows and blasting powder proved futile. Some of these improvements were completed at places like the Umatilla Rapids between Lewiston and Celilo Falls, but the process was exceedingly tedious and the costs excessive.⁴⁰

From the 1870s to the 1890s, improvements on the upper Columbia were confined to blasting rocks and installing navigational aids like buoys and ringbolts. Unfortunately, few steamers could profit from these energetic but minor efforts. The owner of a steamer tried in vain for three years to build up a trade between Celilo Falls and Priest Rapids, spending as many as ten days on a single trip from Celilo, laboriously pulling the boat up over Priest Rapids. Captain Symons reluctantly reported in 1891 that the "mere anticipation" of

steamboat service could not justify navigation improvements. Relinquishing his earlier belief that the government "ere long will be called upon to commence the improvement at Priest Rapids and the upper rapids to give a continuously navigable river," Symons now concluded that the existing navigation project was inadequate and could never be satisfactorily improved. Navigation through the rapids would remain dangerous and expensive, discouraging any investment in steamers unless more permanent solutions were found for the larger river system. He advocated a "complete survey and formation of a connected and consistent plan for the improvement of the entire upper Columbia and Snake rivers." He further recommended that all surveys "be referred to and considered by a board of the most experienced engineers . . . with the ultimate goal for formulating a consistent and connected plan for the improvement of the whole Columbia River system of waterways at and above The Dalles."⁴¹

When he completed the survey of the Columbia River from the international boundary to the mouth of the Okanogan River, Symons presented his estimate for comprehensive improvements that would provide good, commercially practicable navigation. The estimate of \$18 million greatly exceeded the \$256,000 expended up to then on the Columbia River above The Dalles and on the Snake River up to Lewiston. It was considerably more than the \$1,877,500 spent at the Cascades and \$1,355,000 at the Columbia River mouth. Aware of the impossibility of Congress funding such a plan, Symons obviously intended his report to put into perspective what it would cost to secure open navigation on this part of the Columbia. In listing the figures for building twelve dams and locks and removing submerged rock, he stated that he wished "simply to illustrate and give a monetary conception of the difficulties which must attend any attempt to make this portion of the Columbia a through highway of commerce."⁴²

Despite Symons' conclusions, Wenatchee and Bridgeport residents campaigned for improvements on the upper Columbia into the early 1900s. The Columbia and Okanogan Steamboat Company offered daily service between Wenatchee and Brewster, with twice weekly trips to Bridgeport added in 1903. With a second steamer line added in 1905, cargo was estimated to be worth nearly \$2 million. All boats were filled to capacity during harvest season; surplus wheat and fruit was stacked along the riverbank. Yet, at certain places, boats still had to rely on lines through ringbolts to help them descend the narrow channels and rapid currents. Even so, interest in navigation improvements on the upper Columbia River was being challenged or superseded by plans for a massive irrigation project in the Columbia Basin.⁴³

In another section of the Pacific Northwest, the Snake River from Lewiston to Pasco was navigable several months of the year. Unfortunately, low water occurred at the same time as the fall harvest, delaying the shipment of grain for several weeks or months. Above Lewiston, navigation was generally limited to stops at grain warehouses at Asotin and a few landings 25 miles upriver on the Snake. Above this point, rapids through Hells Canyon blocked navigation. The Clearwater River, which joins the Snake at Lewiston, was barely used. The Army Engineers' improvements on these stretches of the two rivers more often reflected Congressional and commercial pressures than a practical plan of development. In addition, the rivers above Lewiston had never been properly surveyed, and until the extension of railroad lines from Lewiston to the Camas Prairie, these fertile regions

had no access to outside markets. Engineering works in this corner of the Pacific Northwest also raised the issue of the responsibility of the government in maintaining routes to more isolated sections of the country.

Under pressure from commercial groups and politicians, the Engineers explored some of the most rugged and forbidding terrain of the Pacific Northwest. Despite the bleak prospects for navigation, there was a need to survey these areas which were without railroads, wagon roads or sometimes even good trails. The mining booms in northern and central Idaho and eastern Oregon sparked irregular efforts to bring supplies to mining camps up the Snake and Clearwater rivers. Some saw in the sweep of the upper Snake River through southern Idaho the possibility of an extensive waterway which would open up a vast interior area to trade and communications with the Pacific. The idea was tantalizing, but hardly practical. Although boats of extremely shallow draft regularly steamed up the Snake as far as Pittsburg Landing and occasionally made it up the Clearwater, the possibility of connecting the lower and middle parts of the Snake River was never seriously entertained. Moreover, the Army Engineers saw little use in even surveying this section as Major Nathaniel Michler explained in 1875: "A reconnaissance has yet to be made of the Snake River between Lewiston and the Great Shoshone Falls," he observed. The object of such an effort was "not very apparent as the difficulties and almost the impossibilities of rendering this section of the river navigable are already too well authenticated."⁴⁴

In considering improvements on the middle Snake, costs had to be weighed against the benefits to those living in areas dependent on the river for supplies and services. However, much of the initial interest in navigation upstream from Lewiston in the 1890s hinged on the anticipated opening of the Nez Perce reservation to white settlement. Captain Harry Taylor of the Seattle Engineer Office travelled to the area for a personal inspection of the rivers that possibly could open a country still without rail or road connections. Taylor's journey was by wagon over the mountains on roads that were, he reported, fairly good in summer, aside from the long, steep grades, but became impassable in spring and fall because of mud. Consequently, practically nothing had ever been exported from the region which Taylor described as one of the most productive in that section of the country.⁴⁵

Captain William W. Harts was less successful in his endeavor to survey the Snake up to Pittsburg Landing. Upon receiving a reminder from the Chief that he had not yet received a report of the requested preliminary examination, Harts sent a recital of his woes in trying to get from one point to the next. First, he could not take passage on a steamer as none had ever attempted to get above Asotin; nor could he go by road, rail or by trail as none of these existed. A few months earlier, he had arranged a trip downriver from Huntington, Oregon, to Lewiston in a skiff with a steamboat captain as pilot. When Harts found that he could not make the journey himself, the captain set out alone and barely escaped with his life when the skiff hit a rock. Harts made another attempt to ascend the river on a steamer, but the steamer's owners decided against the trip. Harts promised the Chief he would try again, this time by wagon and horseback going up river. But first he needed to collect information about roads, trails and guides. "In the meantime," he added, "it is quite safe to conclude that no money for a survey of Snake River will be asked for from the general appropriations." Improvements on this stretch were finally undertaken under the watchful eye of

the Lewiston Water and Power Company, and Washington and Oregon Senators.⁴⁶

Congress abandoned the scheme of improving the entire middle Snake, but it continued to appropriate funds to improve the 67-mile stretch on the lower Snake between Lewiston and Pittsburg Landing. Despite the difficulty of clearing a five-foot channel to Lewiston and a two- to three-foot one above, the Army Engineers continued their efforts into the 1920s. In 1925 while still working diligently on the Snake, the Portland Office admitted it would be impossible to obtain project depths of five feet using the open river method of blasting rocks and removing obstacles in the shallow or dangerous sections. Recognizing the practical constraints, the Corps settled for less. It scoured and blasted a four-foot channel and straightened some of the more dangerous curves. Now the main purpose of improving the lower Snake was aiding local shipping.⁴⁷

By this time, the great wheat shipments of the late 1800s

down the Columbia had dwindled to a few steamers transferring grain from the south to the north bank of the Snake. An observer on the banks would have seen few signs of shipping activity. From Lewiston to the railroad link at Riparia there were seven wheat warehouses on the south bank to store the grain waiting to be ferried to the rail depot, but there were no wharves. Below Riparia were neither warehouses nor wharves. Lewiston, which still proclaimed itself Idaho's only seaport, supported only one warehouse along its 4,000-foot waterfront. The warehouse had been constructed for present use and not for an anticipated boom in shipping. Because it did not extend to the water line, workers laboriously trundled freight over gangplanks from the bank into the building. No railroad tracks connected the warehouse and its freight to shipping points above Lewiston although Asotin had three warehouses. Gasoline boats and a few steamers monotonously transferring grain across the Snake were the only evidence of commercial river traffic.⁴⁸

CHAPTER 1. ENDNOTES

1. Col. Milo Fox, Portland Office Engineer to Division Engineer, 27 Aug. 1935, Record Group 77, Seattle Federal Archives and Records Center, North Pacific Division, 503/64/3, "General Correspondence 1931-1940," Vol. 5. Hereafter cited as RG 77, Seattle FARC, NPD. For an overview of early Corps projects primarily in the Willamette Valley, see Estella Dee Brown, "The Corps of Engineers in the Pacific Northwest," (unpublished Bachelor's thesis, Reed College, 1952) and William Willingham, *Army Engineers and the Development of Oregon*, pp. 1-26.
2. Howard McKinley Corning, *Willamette Landings* (Portland: Oregon Historical Society, 1947), pp. 120, 195; Annual Report of the Chief of Engineers 1871, pp. 906, and 1875, pp. 770. Hereafter cited as ARCE. Between 1871 and 1897 federal funds for channel improvements, including reveting riverbanks, totaled \$448,500, and by 1920 the figure was over \$1 million although river traffic had substantially declined. See E. Burslem Thomson, "The Rise and Fall of Traffic on the Willamette River above Portland, Oregon," *Military Engineer*, 13:71 (Sept.-Oct. 1921), pp. 406-08.
3. ARCE 1875, pp. 762-771.
4. ARCE 1891, pp. 3313-318, 2926; Willingham, *Army Engineers and the Development of Oregon*, pp. 40-42, 61-65.
5. Mitchell to Gillespie, 18 June 1902; telegram of Bross to Mitchell, 16 Jan. 1902; and Gillespie to Root, 26 June 1902, RG 77, National Archives, 103, 7523/59 and /60. National Archives hereafter cited as NA.
6. Langfitt to Gillespie, 6 Jan. 1903, RG 77, NA, 103, 7523/115.
7. Roessler to Mackenzie, 2 Dec. 1905; Burton to Mackenzie, 12 Dec. 1905, RG 77, NA, 103, 7523/371 and /378.
8. Roessler to Mackenzie with Helms' endorsement, 16 Jan. 1906; Burton to Taft, 5 March 1906, RG 77, NA, 103, 7523/382.
9. Chamberlain to Maj. Gen. William Black, 22 May 1917, RG 77, NA, 103, 7523/643. On this occasion Chamberlain suspected the Corps of wanting to eliminate funds for the project from the next river and harbor bill.
10. ARCE 1873, pp. 1126, 1598.
11. Samuel and Emily Dicken, *The Making of Oregon: A Study in Historical Geography* (Portland: Oregon Historical Society, 1979), pp. 95-96.
12. Wallis Nash, *Oregon: There and Back in 1877* (London: Macmillan and Co., 1878, reprinted by the Oregon State University Press), p. 121; Junction City, *Oregon Republican*, 16 April 1879, published with resolutions of mass meetings at Junction City, 17 April 1879, in U.S. Congress, Senate Executive Document 188, 2nd Cong., 6th Sess., May 1880, pp. 111-12.
13. *Ibid.*, p. 54.
14. ARCE 1891, pp. 3197; Willingham, *Army Engineers and the Development of Oregon*, pp. 39-40, 83.
15. *Ibid.*, p. 3168; Willingham, *Army Engineers and the Development of Oregon*, pp. 37-38, 83-85.
16. U.S. Congress, House Executive Document 229, 53rd Cong., 3rd Sess.; ARCE 1871, pp. 909-14; ARCE 1872, pp. 986, 988-91. For an example of Oregon's interest in improving the river, see Memorial of the Legislative Assembly, 9 Jan. 1871 in U.S. Congress, House Miscellaneous Document 21, 41st Cong., 3rd Sess.
17. ARCE 1879, pp. 1856-63.
18. Eastwick to Symons, 14 Sept. 1891, ARCE 1892, p. 2775; Norman H. Clark, *Washington: A Bicentennial History* (New York: W. W. Norton & Co., Inc., 1976), p. 5; Writers' Program, Work Projects Administration, *Washington: A Guide to the Evergreen State, American Guide Series*, revised ed. (Portland: Binford & Mort, 1950), p. 48.
19. ARCE 1895, pp. 3485-86.
20. U.S. Congress, House Document 706, 63rd Cong., 2nd Sess., 4 February 1914; Letter of commercial bodies of Hoquiam, Aberdeen, Montesano and others to Senator J. L. Jones, ca. 1913, RG 77, Seattle FARC, Box 167, "Jetty - Grays Harbor."
21. Letter to Board of Engineers, 22 April 1914, *ibid.*
22. *Ibid.*
23. Cavanaugh to President of Grays Harbor Port, 28 Jan. 1914, *ibid.* Both Grays Harbor and Willapa Bay contributed funds for improvement projects, see ARCE 1915, pp. 1552, 1554.
24. Thomas William Symons, *Report on the Upper Columbia River and the Great Plains of the Columbia* (Fairfield, Washington: Ye Galleon Press, 1967), p. 97. This is a reprint of the original report included in ARCE 1888 and also published as Senate Executive Document 186, 47th Cong., 1st sess., 1882.
25. *Ibid.*, pp. 56-67.

26. Ibid, p. 73.
27. Ibid, pp. 73, 115.
28. Donald W. Meining, *The Great Columbia Plain: A Historical Geography, 1805–1910* (Seattle: University of Washington Press, 1968), pp. 279, 401; William Willingham, "Engineering the Cascades Canal and Locks, 1878–1913," *Oregon Historical Quarterly* 88 (Fall 1987), pp. 228–257.
29. "Report of the Board of Engineers for Pacific Coast," 24 Sept. 1877, in ARCE 1878, pp. 1340–44; ARCE 1880, p. 2301.
30. Newspaper clippings filed with RG 77, NA, "General Correspondence 1891," 839/1.
31. Handbury to Chief of Engineers, 9 Feb. 1891, RG 77, NA, "General Correspondence," 839/5; ARCE 1893, p. 3203.
32. Portland *Oregonian*, 6 Nov. 1896.
33. Mendell to Chief, 8 Oct. 1895, RG 77, 103, 11112/3. Mendell was the only officer who had served on both boards and consequently felt it his responsibility to send a summary to the Chief's Office.
34. This system, which had been seriously discussed in European engineering circles, consisted of hydraulic lifts which would remove boats from the water and place them on rail cars to be transported around the rapids where they could be reinserted in the river.
35. Chief of Engineers General Thomas Casey to Secretary of War Redfield Proctor, 13 Dec. 1889, RG 77, NA, Letterbook 11; Portland Chamber of Commerce, "Lewiston to Portland by Water in 1905," Dec. 1901, *ibid*, 103, 35879/72; Willingham, *Army Engineers and the Development of Oregon*, pp. 73–80.
36. Heuer to Gillespie, 26 Sept. 1902, *ibid*, 35879/76.
37. Heuer to Maj. W. L. Marshall, 28 Jan. 1903, *ibid*, 35879/L.
38. Spokane *Spokesman-Review*, 5 and 6 May 1915; Meining, p. 474; ARCE 1925, pp. 1674–75; ARCE 1930, pp. 1873–76.
39. ARCE 1905, pp. 747–49; ARCE 1925, p. 1673; ARCE 1930, pp. 1872–73.
40. ARCE 1914, p. 1381; Willingham, *Army Engineers and the Development of Oregon*, pp. 50–51.
41. ARCE 1891, pp. 3326–29.
42. ARCE 1893, pp. 3390, 3202.
43. Meining, *The Great Columbia Plain*, p. 374; Seattle Assistant Engineer J. M. Clapp to Lt. Francis A. Pope, Seattle Office Engineer, 1 Nov. 1905, RG 77, Seattle FARC, "Columbia River Examinations and Surveys," 7246.
44. ARCE 1875, p. 781.
45. Taylor to Chief, 25 Aug. 1896, RG 77, NA, 103, 12329/10.
46. Harts to Wilson, 1 Aug. 1899; Lewiston Water and Power Company and Senators George Turner of Spokane and A. G. Foster of Tacoma, 30 Aug. and 3 Nov. 1902, RG 77, NA, 103, 30410/3, 44292/1 and /2 respectively.
47. ARCE 1925, pp. 1671–72.
48. ARCE 1930, pp. 1880–85.

II

THE NATIONAL CONSERVATION MOVEMENT AND WATER RESOURCE PLANNING, 1900–1925



We hand you herewith a copy of resolutions adopted at an Open River Conference held under the auspices of the Open River Association... We earnestly hope that you will be able to give the matters therein referred to your attention and consideration, as it is obvious to us that the settlement of the Columbia Basin is contingent upon the utilization of the Columbia for reclamation, power and navigation, and that only by a concerted program, with government aid, can projects so large be consummated.

Marshall Dana
Secretary, Open River Association
December 5, 1922



The steamers *Asotin*, *Umatilla*, *Spokane* and *Lewiston* at the Port of Lewiston, c. 1916

1. The Roosevelt Conservation Movement and Water Resource Legislation

At the turn of the century, the North Pacific Division was a small organization with limited authority whose primary function was the improvement and protection of navigation. During the first 25 years of its existence, federal legislation and policy expanded the Division's scope to include multiple purpose planning and development for the second largest river system in the nation. These changes, initiated from Washington, D. C., and affecting the entire Engineer Corps organization, were brought about largely as a result of the conservation movement that started during Theodore Roosevelt's presidency and maintained its momentum through succeeding administrations.¹

The conservation movement epitomized by Roosevelt and Gifford Pinchot, chief of the newly created Forest Service, was a reaction to the reckless exploitation of the nation's resources, largely by private corporations. Roosevelt's conservationism, unlike the preservationism of his contemporary John Muir, did not oppose development of natural resources. On the contrary, it sought the wise and full use of timber, mineral and water resources while simultaneously protecting the public's interests. Roosevelt spurred passage of the Newlands Act which created the Reclamation Bureau; withdrew mineral, oil and water power sites from private entry; and created extensive forest preserves in the West. At the same time, he strongly advocated the full and complementary use of the nation's waterways. Under his leadership, Congress mandated a wider role for the Corps of Engineers, greatly expanding its traditional responsibility of improving waterways solely for navigation.

Water resource legislation enacted during the period 1890 to 1925 tended firmly toward consideration of multiple uses of rivers. The 1890 Rivers and Harbors Act made it illegal to construct dams or other riverine facilities in streams without permission of the Secretary of War. The law was particularly applicable for regulating bridges which obstructed navigation. Another provision of the 1890 law, prohibiting dumping refuse into waterways, resulted in some victories for conservationists and proved that regulations could be enforced. It was the 1899 Refuse Act which provided the strongest basis for waterways protection. This act prohibited obstructions such as fishing nets and traps, a particularly irksome problem at the mouth of the Columbia River.²

From 1906 to 1912, several Congressional acts addressing the relationship of navigation to other uses of waterways increased the Corps' authority. The 1906 General Dam Act departed from the usual practice of passing legislation for specific private power projects on navigable streams. This act set general conditions for authorizing nonfederal projects, including the provision of fish passage facilities. An act of 1909 required reports of examinations and surveys to include the development and utilization of water power for industrial and commercial purposes and other appropriate subjects. The 1910 Dam Act went further than the 1906 Dam Act in that it required the Secretary of War to consider the effect of a structure upon a comprehensive plan for the improvement of the waterway in relation to navigation, and the full development of water power. That same year, the Rivers and Harbors Act provided that surveys should include data on streamflow

and watershed and consider all uses of the stream affecting navigation. In addition, the Corps was permitted to conduct surveys and investigations on streams where dams were to be constructed in order to protect navigation interests. Two years later, the 1912 Rivers and Harbor Act, in response to the growing interest in multiple purpose dams, permitted the Secretary of War to include in an authorized dam "such foundations, sluices, and other works, as may be considered desirable for the future development of its water power."³

These Congressional acts authorized the Corps to increase its regulation of rivers, provide for future development of water power at dam sites, and include a more comprehensive area in its examinations and surveys. At the same time, the Roosevelt administration advocated the formation of a national, coordinated, interagency planning policy.

After Roosevelt established the Inland Waters Commission in 1907, he clearly stated his position on the development of the nation's waterways. The basis of the Commission's formation in 1907, he observed, was "the general and admitted inability of the railroads to handle promptly the traffic of the country, and especially the crops of the previous fall."⁴ In comparison with rivers of other countries, Roosevelt described those of the United States as poorly developed and insignificant in the industrial life of the nation. According to the Commission, the lack of commerce on the nation's waterways was due to monopolistic practices of railroads in driving out competition. Looking beyond the obvious remedy of careful government regulation of railways, Roosevelt contended that "every stream should be used to the utmost." Explaining that only long range planning could accomplish this, he asserted that "it is poor business to develop a river for navigation in such a way as to prevent its use for power, when by a little foresight it could be made to serve both purposes." In criticizing the shortsightedness of single purpose planning, Roosevelt remarked, "We cannot afford needlessly to sacrifice power to irrigation, or irrigation to domestic water supply, when by taking thought we may have all three. Further, every river from its headwaters to its mouth is a single unit and should be treated as such."⁵

In order to promote the full and coordinated development of rivers, the President advocated a national policy, for "the National Government must play the leading part in securing the largest possible use of our waterways. . . the work is essentially national in its scope." Roosevelt decried the piecemeal development of waterways and suggested the adoption of a "definite and progressive policy," a concrete general plan prepared by the best experts and executed by one man or one group who would be held accountable. This would mean, of course, a reorganization of agency responsibilities for water-related projects. He emphasized that it was necessary to create a new government entity, stating that, in order to deal with a river system as a single unit, Congress should provide an administrative mechanism for coordinating the work of the bureaus which were scattered throughout four federal departments. In his opinion, the existing policy for developing inland waterways had been largely negative. Roosevelt also advised that only sound projects should be initiated, and then only when sufficient funds to complete them were available.⁶

The Commission's report, endorsed by eight members, was not approved by its ninth, General Alexander Mackenzie, Chief of Engineers. Mackenzie agreed that inland waterways should be expeditiously improved with cooperation among federal, state and local agencies, and that the War Department should include in its plans considerations other than

navigation. In fact, he supported the conservation movement's commitment to protecting, to the greatest extent, the natural resources of the country. However, he challenged the report's conclusion of an association between national progress and navigation improvements. Behind Mackenzie's politely worded objections to the report was his defense of the Corps' prerogatives. The establishment of a permanent waterways commission could usurp its authority over navigation. Instead of this radical departure from the status quo, he pointedly suggested that the Commission should concentrate on preparing a comprehensive plan which was what it had been authorized to do. He believed that the completed plan for the nation's waterways would demonstrate that existing agencies could carry out the recommendations more efficiently than a permanent commission. Presumably, such a delay while the report was being prepared also would allow the Corps to gather support in Congress.

Indeed, Congress did not authorize a permanent commission, partly because of General Mackenzie's opposition. Roosevelt did appoint a second commission in 1909, the National Waterways Commission, which produced a final report in 1912. Unlike its predecessor, this commission was concerned primarily with practical matters of protecting waterways and did not recommend a permanent planning body. It took a more conservative position contending that although only the federal government was capable of administering a comprehensive policy of river development, it was too early to predict if such federal control was desirable. It also advocated a permit system for dams which would give preference to public use. However, the Commission, dominated by the House Committee on Rivers and Harbors and the Senate Committee on Commerce, believed that the government lacked authority to construct projects solely for flood control or power development. It considered flood control a local problem and wanted government participation in such projects limited to sharing costs where navigation would be benefited.⁷

Under the persistent efforts of Senator Francis Newlands of Nevada and with the support of the succeeding administrations of William Howard Taft and Woodrow Wilson, Congress in 1917 approved a permanent Waterways Commission to coordinate the efforts of all government agencies in order to develop comprehensive plans for the multiple development of waterways and water resources. Because of the nation's involvement in World War I, President Wilson did not appoint members to the Commission, and the 1920 Federal Water Power Act repealed the Commission. This act, which created the Federal Power Commission, sought to regulate the non-federal development of waterways while protecting the public's interest and making ultimate public ownership possible. Members of the Commission included the Secretaries of the Army, Interior and Agriculture. They were empowered to continue surveys on developing water power. They could also determine if power from federal dams could be used for public purposes and what would be the fair value of that power. Although the lack of separate funds and staff hindered the work of the Federal Power Commission, by 1922 the Commission had acted on over 200 applications.⁸

The increased role of the government in regulating private development of waterways found expression in the 1925 River and Harbor Act which led to the "308 Reports" of the 1930s. Under this legislation, the Corps of Engineers and the Federal Power Commission were to submit an estimate of the costs of examinations and surveys on navigable streams, excluding the

Colorado River, "whereon power development appears feasible and practical." The goal of the estimates was the formulation of "general plans for the most effective improvement of such streams for the purposes of navigation in combination with the most efficient development of the potential water power, the control of floods, and the needs of irrigation."⁹

2. The Multiple Use Concept

The Mississippi River system occupied much of the nation's attention during the early 20th century because of damages from massive floods and its status as a major transportation artery for industries and agriculture in the heavily populated midwestern and southern states. Although the Columbia River was acknowledged as a potential source of vast hydroelectric power, with an estimated capacity of 10 million horsepower, sparse population and lack of industrial development in the Pacific Northwest limited development to small power dams and irrigation projects. While Congressional and Presidential interests broadened to multiple-purpose considerations, the North Pacific Division continued to concentrate its work on major navigation projects at the mouth of the Columbia River, Oregon and Washington harbors, and The Dalles-Celilo canal and locks.

While the Division's activities during this period were still oriented toward navigation, division engineers were aware of increasing interest in other uses of the Columbia River system, particularly reclamation in the Columbia Basin and power projects on tributary rivers. The movement toward a permanent waterways commission pointed to the need for coordinated planning on a regional level. In 1913 Colonel J. M. Russell, senior member of the Board of Engineers, recommended creation of a basic plan reflecting improvements warranted by present and future needs of commerce on navigable streams. He advocated making projects consistent with commercial use of the streams and their physical characteristics. Russell had a compelling reason for advocating this type of planning by the Corps. If the Corps did not act, Congress might pass radical legislation to enforce water resource planning through a permanent Waterways Commission like Senator Newlands had proposed. Russell suggested that the Chief of Engineers ask district officers to prepare reports to provide basic data for this comprehensive plan.¹⁰

Division officers soon met to consider Russell's recommendations. Only Major S. A. Cheney from the Pacific Division suggested that the reports should consider all uses of water resources and their relative importance and not arbitrarily assign navigation "paramount importance." All concurred, however, that the reports could properly contain remarks on these allied uses or even broader uses as suggested by the Newlands Bill. They also agreed that the district officers should coordinate plans for rivers like the Columbia that traversed more than one district in order to achieve harmonious development. The discussion revealed that non-navigation interests were becoming more important. In relating navigation to flood control, irrigation, and hydropower, the engineers questioned whether the War Department could still take initiative for projects in which navigation interests were a small portion, perhaps only five per cent. Major Cavanaugh, District Engineer at Portland, stated that the government should retain interests in such projects in order to preserve navigation rights. Some felt that charges for a project could be made against other uses, even if the use occurred above the navigable portion of the stream.

The conference discussion disclosed a consensus on irrigation. The engineers considered it more important than either navigation or hydropower, especially in the Columbia Basin. Consequently, it should be a proper subject of their reports and, the engineers conceded, it would be desirable to voluntarily recognize its importance rather than be forced to do so.¹¹

While the Pacific Northwest Army Engineers contemplated the new reality of water resource priorities, proponents of navigational improvement on the lower Snake River continued to press for action. Despite clear evidence that traffic on the lower Snake was negligible and that costs of improvements would far outweigh benefits, supporters maintained their campaign through Congressional delegates, employing a strategy that had been effective in the late 1800's. The Lewiston Commercial Club, the Columbia and Snake River Waterways Association, and Idaho Congressmen William Borah, Burton French and Weldon Heyburn among others, urged Congress in the early 1900's to authorize another survey of various segments of the Snake from its mouth to above Lewiston. In 1915 they succeeded in obtaining Congressional authorization for the survey, including possible construction of locks and dams on the Snake. But the results were disappointing. The Board of Engineers agreed with the District Engineer that navigation could not justify the construction of such dams and locks. It disagreed with a second recommendation to improve the channel, believing that maintenance operations were adequate for the present navigational needs. In view of the considerable interest in the project, the Board asked the District Engineer to send a copy of his report to Congressional delegates from the states of Washington, Idaho and Oregon, as well as to commercial clubs, newspapers and regional businesses.¹²

The failure of persistent efforts by politicians and interest groups to secure funds for the Snake River signified a more conservative attitude toward improvements of this type in the Pacific Northwest. Whereas projects of doubtful benefit had been adopted before on this part of the Snake River, the Corps was now more cautious and selective in its recommendations. This attitude was in keeping with Roosevelt's 1908 statement to the Inland Waters Commission that only sound projects should be adopted and that water projects should consider the best and full use of streams. In fact, in 1902 Congress had authorized the creation of the Board of Engineers for Rivers and Harbors as a check on demands for unwise projects. The Board was empowered to review reports from districts in view of the amount and character of commerce and the relation of cost to the public commercial interests involved. The Board did its work so thoroughly that 70 percent of the surveys it reviewed from 1902 to 1922 received adverse recommendations.¹³

Proponents of river development, wishing to use hydropower to help justify navigation improvements, were also temporarily stalemated by the lack of power markets in the Pacific Northwest and the conservative attitude of the Army Engineers. When Chief of Engineers General Mackenzie requested opinions on Roosevelt's position that the sale of power could finance improvement projects, North Pacific Division Engineer Colonel Solomon Roessler pointed out that although great opportunities for hydropower existed on the Snake and Columbia Rivers, the lack of population centers did not justify their development.¹⁴

A steamer at the mouth of the John Day River Dec. 1913, just above the site of the future John Day Dam, construction of which began in 1958

The Interior Department essentially agreed with Roessler's conclusion. In anticipating future demands for power production, however, Interior was more aggressive than the War Department through its policy of withdrawing potential power sites from private ownership. The 1902 Reclamation Act empowered the Reclamation Bureau to sell surplus power at its reclamation projects as a means of financing them. The 1910 Withdrawal Act further authorized the President to withdraw any public lands and reserve them for water power, irrigation or other public purposes. After a survey of power site reserves on the Columbia River by the United States Geological Survey in 1911, the Department withdrew four such sites on the upper Columbia River. In reviewing the general prospects for power development in the interests of reclamation, the Director of the Geological Survey, George Otis Smith, concluded that the difficulty and expense of a dam across the Columbia would preclude construction for many years until there was a considerable increase in the market price for power. Smaller streams should be dammed first. Smith also questioned the practicality of developing power through diversion canals; one such project at Priest Rapids had not proven economical. He further noted that provisions in the 1910 General Dam Act empowered the Chief of Engineers to protect present and future navigation works, to assess and collect fees as compensation for the development and maintenance of storage by the government, and to purchase and maintain forests in the headwaters of a river developed for water power. In terms of the type of development the Interior Department and the War Department were pursuing in 1911, power development on the lesser tributaries of the Columbia River, such as the Wenatchee and Spokane Rivers, appeared more feasible than on the main stem. In fact, as Smith concluded, agricultural development of benchlands along the Columbia appeared more valuable than production of power at remote locations.¹⁵

In view of the agreement between the Departments of the Interior and War that development of hydropower sites on the



Columbia and Snake rivers was not yet feasible, it is understandable that they were amenable to cooperating in the issue of land withdrawals. This was suggested by the Interior Department's Chief Law Officer, Philip P. Wells, in July 1911. Both district engineers, Majors Morrow and Cavanaugh, agreed. In a joint endorsement to the Chief, they reiterated the opinion that the canalization of the upper Columbia River was not practical in the near future. Consequently, such withdrawals would not interfere with navigation. It is interesting that the matter was not forwarded through the Division Engineer, Col. Thomas Rees in San Francisco.¹⁶

Although the War and Interior Departments were not enthusiastic about power projects at this time, private investors and the State of Oregon were keenly interested. Private investors had acquired water rights on the Deschutes in Oregon, 15 miles upstream from The Dalles. They felt their investment was being threatened by a project promoted by the Oregon legislature, the Columbia River Power Project. In 1913 the legislature created a commission to study power possibilities on Five Mile Rapids, also above but closer to The Dalles. Alarmed by this move, the private investors argued that Oregon's project would interfere with navigation through the Celilo Canal then under construction by the Corps of Engineers. Oregon continued to push its project. Although it would not welcome competition from the Federal Government, it did want its engineers to survey possible power sites. Oregon State Engineer John H. Lewis, anxious to begin investigations, recommended immediate preparation of a comprehensive plan. He suggested that consulting engineers be obtained from both the War and Interior Departments; the Secretary of War would "no doubt" consent to detail two engineers along with those from the Reclamation Service. Together they would form a disinterested board of experts at no expense to the state. The Chief of Engineers refused the request on the grounds that no authority for this service existed, especially in view of the extensive nature of the investigation. The Chief's Office also worried that a power

project above The Dalles would affect navigation and other improvements that had cost \$5 million. It did assure Oregon that the local engineer office would make available information pertaining to navigation.¹⁷

In 1914 Oregon Representative Nicholas Sinnott, a native of The Dalles, also tried to acquire the services of engineers from the two departments through a Senate resolution which was later withdrawn at the request of the War Department. By this time, interest in hydropower was heightened by the possibility of using this power to produce nitrates for fertilizers and munitions. Again, private investors complained to the Secretary of War that Oregon was undermining their investments on the Deschutes with the assistance of the Corps of Engineers. On its behalf, Oregon produced a bulletin in February 1916, "Oregon's Opportunity in National Preparedness". Along with promoting nitrate production, it claimed that such a project would produce indirect benefits to navigation, irrigation and commerce. In the meantime, a report from the Chief of Engineers undercut this hope by concluding that existing power plants could produce more nitrates than could be used for military purposes.¹⁸

The excitement surrounding nitrate manufacture prompted a very uncharacteristic and controversial response from North Pacific Division Engineer, Colonel Charles Potter. The possibility that Congress might support a hydroelectric plant for a nitrogen-fixing process intrigued Potter so much that he took the liberty of writing a long letter to Oregon Senator George Chamberlain. Potter hoped that Congress would not overlook the Deschutes River which was his own candidate for hydropower development. Referring to data supplied by an anonymous informant, he described the favorable costs and benefits, and several indirect benefits to be gained from industries associated with the project. Potter also praised the military advantages of the site. In keeping with the general conservative attitude toward large, federally funded water resource projects, Potter roundly criticized advocates of large-scale projects at the Cascades and Celilo. Referring to

discussions in Portland newspapers, Potter remarked how these people made the mistake of thinking that "when the United States takes hold of a matter, it must be done on a grand scale." "We live", Potter noted, "in an age of superlatives." One or two dams at the most were, in his opinion, the best solution. Chief of Engineers General W. M. Black rebuked Potter for writing directly to Chamberlain, particularly at that time. He noted that Potter could not possibly know all facets of the issue and the letter was much more likely to do harm than good. He advised that letters of this sort should be sent through the Chief's Office which would decide whether or not to forward them. However, in October 1916, the Portland Office sent an engineer to investigate the lower Deschutes as part of a larger investigation by the War Department on suitable power sites for nitrate production.¹⁹

In contrast to Potter, advocates of a massive reclamation project in central Washington unashamedly boosted their schemes in these years. They had two proposals. The first was for a dam to divert water from the Columbia into the Grand Coulee, a natural formation created by a temporary diversion of the Columbia during the ice age. From there the water would be pumped into irrigation canals. Opposing the "pumpers" were backers of the gravity plan, including Washington power companies and Spokane businessmen. They supported diverting water from Lake Pend Oreille to the central basin through a long canal. This system would provide irrigation water and protect their investments in power plants on the Spokane River. Both plans assumed that the federal government would provide assistance as the schemes were too extensive for private investors. Despite the long battle over which project would be funded and constructed, by 1923 Pacific Northwest economists confidently spoke of the Columbia Basin irrigation project as an accepted fact of the future. They believed its magnitude would far out-rival any other single project as it would irrigate almost 1,750,000 acres of arid land.²⁰

In the fertile lands of central Washington, small irrigation canals had already transformed dry rangelands around the Wenatchee, Methow and Yakima rivers into productive orchards and fields. The resumption of steamboat traffic on segments of the upper Columbia in response to agriculture and private hydroelectric developments made multiple-purpose uses of the Columbia a vital concern. The Corps' primary mandate remained protection of navigation rights. When a seemingly uncontroversial bill was introduced into the Senate by Washington Senator Addison Foster, "To Authorize the Building of Dams and Other Improvements in the Columbia River in the State of Washington," Major John Millis of the Seattle District quickly pointed out an important error to Chief of Engineers Generespie. The language of the bill indicated that the upper Columbia was unnavigable and thus the works would not effect navigation. It was necessary to protect the Corps' interest, especially at a time when commercial groups were using the Corps to examine the upper Columbia for the possibility of improving navigation. Gillespie succeeded in amending the bill by deleting the reference to the unnavigability of the river and by adding a clause ensuring that the Secretary of War would approve all plans and specifications and impose conditions and terms to protect the public interest. Despite these safeguards, Gillespie worried that Congress had not thoroughly investigated the implications of power development because of pressure to pass the bill that session.²¹

Although the Division acknowledged the importance of hydropower and irrigation for the development of the region's rivers, its work was confined to navigation. By the 1920s, the

Division realized successful navigation improvements on the Columbia, Willamette and Snake were limited. Inspection reports by Division Engineers Colonel Edward H. Schultz and Colonel W. J. Barden in the 1920s were not encouraging. In April 1923, Schultz toured the project at The Dalles and noted that nine workmen and a superintendent were employed to keep this valuable improvement in good order despite the fact that there was practically no traffic through it. Barden added in a later report that there had been no commercial navigation through the canal for three years and "there seemed little prospect of its resumption." But, it was not yet advisable to abandon it. Barden also discounted any possibility of river traffic resuming on the Willamette River between Salem and Albany although the Army Engineers continued to repair and rebuild a considerable portion of the flood-damaged revetment. Here, Barden admitted, the benefits were primarily local and non-navigational, limited to the protection of valuable farmland. On the Willamette below Salem, however, river commerce in logs was increasing due to a new paper and board company at Longview, Washington on the Columbia. Barden saw in the daily trip of the one sternwheeler a promise of a navigation revival.

Perhaps the most revealing example of the limits of single purpose navigation projects occurred during Barden's inspection of the lower Snake River during low water in December 1924. Intending to inspect the open river improvements between Lewiston and The Dalles-Celilo canal and locks, Colonel Barden with Captain Mayo and Major Park boarded the government steamer *Umatilla* at Lewiston. The steamer drew three and one half feet; the river gauge was less than two and one half. Nonetheless, the *Umatilla* clumsily made its way downstream, proceeding stern first, using its rake as a drag after grounding at Log Cabin Rapids. The party almost reached Riparia before nightfall, but were then forced to wait two days during a storm which buffeted them with winds Barden described as sufficiently severe. Faced with the prospects of continuing a dangerous and undignified passage down the Snake River, the three engineers abandoned ship on the third day, and returned to Seattle by rail.

Barden's report of the channel and proposed improvements was correspondingly negative. "I do not think," he reported, "a channel of the project depth [5 feet] could be obtained and maintained for the amounts estimated [\$83,000 plus \$6,000 annually for maintenance]." He also noted the lack of through commerce since 1920 with no prospect of its resumption. This was due to the difficulty of navigation, high operating and fuel costs, and the lack of patronage. Barden's survey of the channel took into account a competing use of water resources by irrigation projects. He learned that in south central Idaho, 600 miles above the mouth of the Snake, the Minidoka Dam diverted water from the Snake from April to mid-October, a period which coincided with the lowest stages of the river. In view of all these factors, how could the small *Umatilla* with its derrick and gravel rake hope to remove the shoals, keep the wing dams in good repair, and deepen the channel?²²

Those favoring improvements in navigation on the upper Columbia and lower Snake Rivers faced a dilemma. The scale of investment was too high for private groups, yet the modest appropriations that Congress was willing to make had produced minimal benefits for those who needed cheap navigation the most - farmers in the interior. Even though the completion of The Dalles-Celilo Canal in 1915 eliminated some of the roughest passages, without improving the entire

river system from Portland to Lewiston, interior producers would be forced to rely on railroads and trucks.

Proponents for navigation and reclamation projects represented in a general way the different interests of the Corps and the Bureau of Reclamation. Although the public primarily conceived of the Columbia Basin as an irrigation project, the Corps exerted its influence through its surveys in the late 1920s in preparation for the comprehensive report published in 1932. Groups like the Open River Association recognized the intertwining role of the Corps with the Bureau in multiple-purpose development and stated that navigation would be only one interest in future projects. In a meeting held at Pendleton, Oregon, in November 1922, the Association urged the Secretary of War to appoint a special Board of Engineers to consider canalization of the Columbia from Vancouver to Priest Rapids, and the Snake River from its mouth to Asotin. Navigation was to be considered along with hydropower and irrigation as a cooperative venture between the government and local interests. Such a report, the Open

River Association asserted, could be used by the Reclamation Service, the Federal Power Commission, or any other government body empowered to create the projects. The resolution assumed that the Corps would continue to exert its influence on any future development of the two rivers. In transmitting the resolution to the Secretary of War in December, the influential secretary of the Association, Marshall Dana, remarked, "It is obvious to us that the settlement of the Columbia Basin is contingent upon the utilization of the Columbia for reclamation, power and navigation, and that only by a concerted program, with government aid, can projects so large be consummated."²³

The consummation of such large multiple-use projects as those in the Columbia Basin indeed depended on government cooperation and financing. The initiation of projects for the Basin and the Columbia River came with legislation in the late 1920s which transformed the number of a House document, "308", into a symbol of comprehensive planning for the Pacific Northwest.

CHAPTER 2. ENDNOTES

1. Background on the conservation movement, see Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Cambridge: Harvard Univ. Press, 1959); and Donald C. Swain, *Federal Conservation Policy 1921-1933* (Berkeley: University of California Press, 1963).
2. Albert E. Cowdrey, "Pioneering Environmental Law: The Army Corps of Engineers and the Refuse Act," *Pacific Historical Review*, 46:3 (Aug. 1975), p. 338. Until modern legislation and the passage of the National Environmental Protection Act in 1969, provisions of the 1899 Act against pollution were not vigorously enforced or viewed as a proper function of the Corps. See Cowdrey for a discussion of the law; William Willingham, *Army Engineers and the Development of Oregon*, pp. 192-195.
3. These laws are discussed in President's Water Resources Policy Commission, *Report of the Commission*, Vol. 3, *Water Resources Law*, (Washington, D.C.: Government Printing Office, 1950), pp. 391, 396, 397, 398.
4. Commercial organizations in the Mississippi Valley presented petitions to Roosevelt in 1907 requesting that he appoint a commission to investigate a comprehensive plan for improving and controlling river systems of the United States. See U.S. Congress, Senate, Document 325, Inland Waterways Commission, *Message from the President Transmitting a Preliminary Report of the Inland Waterways Commission*, 60th Cong., 1st sess., 1908, pp. iii, 15. Hereafter cited as Inland Waterways Commission Report.
5. *Ibid*, p. iv.
6. *Ibid*, pp. iii-vii.
7. U.S. Congress, Senate Document 469, National Waterways Commission, *Final Report*, 62nd Cong., 2nd Sess., 1912, pp. 24-25, 27-28, 47, 60-61.
8. *Water Resources Law*, pp. 273, 403, 405; Beatrice Holmes, *A History of Federal Water Resources Programs, 1800-1960* (Washington, D. C.: U.S. Dept. of Agriculture, Economic Research Service, 1972), pp. 8-9; William Kelly, "Work of the Federal Power Commission Since Its Creation, June 1920," *Military Engineer*, 14:77 (Sept.-Oct. 1922), pp. 307-310.
9. *Water Resources Law*, p. 408.
10. Rossell to Chief, 7 April 1913, RG 77, NA, 103, 89050.
11. Memorandum of Discussion of District Engineer Officers Stationed on the Pacific Coast, 22-26 July 1913, RG 77, NA, 103, 89050.
12. Board of Engineers, 13 Feb. 1923 with enclosure, "Public Notice Relative to the Proposed Improvement of the Snake and Columbia Rivers, March 1923," *ibid*, 24443/1677 and /1679; Wallace R. Strubble, Lewiston Commercial Club to Borah, 23 July 1912, *ibid*, 24443/1644; French to Chief, 2 Aug. 1912, *ibid*; Heyburn to Henry Stimson, Secretary of War, 7 Aug. 1912, *ibid*, 24443/1642; W. P. Gray, Columbia and Snake River Waterway Association, 27 March 1913, *ibid*, 89004.
13. Holt, p. 24; *Water Resources Law*, p. 516; W. Stull Holt, *The Office of the Chief of Engineers of the Army: Its Non-Military History, Activities, and Organization*, Institute for Government Research: *Service Monographs of the United States Government*, No. 27; (Baltimore: The Johns Hopkins Press, 1923), p. 23.
14. Roessler to Mackenzie, 20 April 1907, RG 77, NA, 103, 62743.
15. *Water Resources Law*, pp. 184, 265; Smith to Secretary of Interior, 14 June 1911, RG 77, NA, 103, 82243/10.
16. Wells to Secretary of Interior, 10 July 1911, RG 77, NA, 103, 82243/3; Secretary of Interior to Secretary of War, 7 Aug. 1911 and second endorsement of Morrow and Cavanaugh, 26 Dec. 1911, *ibid*, 83343.
17. C. D. Charles to Lindley H. Garrison, Secretary of War, 9 Sept. 1913, *ibid*, 35879/321; *Oregon Sunday Journal*, 7 Sept. 1913 and endorsement by Col. Ian Kingman, Acting Chief of Engineers, 11 Oct. 1913, RG 77, NA, 103, 91388/1; Maj. W. Kelley to C. D. Charles, 14 Oct. 1913, *ibid*, 35879/321.
18. Charles to Garrison, 8 Nov. 1915, *ibid*, 35879/347; John H. Lewis, "Oregon's Opportunity in National Preparedness," *Bulletin No. 5* (Salem: Office of the State Engineer, 1916), in *ibid*, 99516/769; Chief of Engineers to Chief of Staff, 30 Dec. 1915, *ibid*, 99516.
19. Potter to Chamberlain, 20 March 1916; Black to Potter, 1 April 1916, *ibid*, 99516/14. This was authorized by the 1916 National Defense Act of 3 June 1916, see *Water Resources Law*, p. 54.
20. Michael Green, "Politics and Kilowatts: Washington Water Power Company and Public Power, 1918-1941" (Unpublished master's thesis, University of Idaho, 1962), pp. 19-20; William W. Johnston, "Irrigation in the Northwest," in Howard T. Lewis and Stephen I. Miller, eds., *Economic Resources of the Pacific Northwest* (Seattle: Lowman and Hanford Company, 1923), p. 124.

21. Millis to Gillespie, 23 Jan. 1903 with copy of proposed bill and Gillespie's amendments; Gillespie to Secretary of War Elihu Root, 12 Feb. 1903, RG 77, 103, 45701/1, /2, and /9.
22. Schultz to Chief, 1 April 1923, RG 77, NA, 103, 2334/2, Barden to Chief, 3 Nov. 1923, *ibid*, 2334/9; Barden to Chief, 4 Dec. 1924, *ibid*, 2334/22; Barden to Chief, 2 Jan. 1924, *ibid*, 2334/11.
23. Resolutions of Open River Conference, 17 Nov. 1922, *ibid*, 24443/1672; Dana to Secretary of War, 4 Dec. 1922, *ibid*, 24443/1673. The Boards' report in 1923 was negative. See letter and endorsements of H. Taylor, Board of Engineers, to Chief, 13 Feb. 1923, *ibid*, 24443/1677.

III

MAKING THE SURVEY, 1926–1932



MG Thomas M. Robins

The study now being made under your direction impresses me as being a perfectly unbiased attempt to present all the factors needed to decide upon the best method of using the water of the Columbia and its tributaries for the reclamation of the Columbia basin tract.....I think that the work is being done in a very efficient manner. So far as I can see nothing is being overlooked and nothing unnecessary is being done. I like the way the investigation is being handled and I can suggest no changes in the methods you are using.

A.J. Wiley,
Consulting Engineer, Bureau of Reclamation,
October 4, 1930
to Major John S. Butler, Seattle District Engineer



Col Gustav R. Lukesh

1. Introduction

In the mid-1920s the future of water resource projects appeared hopeful. Congress had encouraged the multiple-use concept and Secretary of Commerce Herbert Hoover supported the development of waterways as a consolidated system. In particular, he warned against wasting money on single-purpose projects benefiting only the local communities. In August 1926, Hoover spent four days inspecting the Columbia River Basin in the company of a farm economist. Impressed with the potential for water resource development, Hoover spoke before the Columbia Basin Irrigation League on the national scope of the project. He was convinced the Columbia River should be embraced in a national program of major water improvements. "It should not be delayed," he emphasized, "until we are overwhelmed with population. The initiation and construction of the Columbia Basin irrigation project is inevitable." He later added that the project was "economically sound and timely."¹

Hoover's support of the Columbia Basin development as part of his larger interest in water resources development corresponded with Congress's willingness to lay the groundwork for a comprehensive survey of navigable rivers and tributaries that had the potential for power development. The 1925 River and Harbor Act authorized the Corps of Engineers and the Federal Power Commission to prepare estimates of these streams "with a view to the formulation of general plans for the most effective improvement" for navigation in combination with water power, flood control and irrigation.²

The report submitted in response to that legislation, House Document 308, listed over 200 individual streams in 24 groups. Of the total estimate of \$7,322,400 to complete the surveys, \$734,100 was allotted for the Columbia River and minor tributaries of the Cowlitz, Lewis, Willamette and John Day rivers; \$215,000 for the Snake River and tributaries; and \$104,100 for rivers north of the Columbia River draining into the Pacific, including the Skagit, Snohomish, Stillaguamish, Puyallup and Chehalis. Thus the total estimate for rivers in the North Pacific Division was \$1,053,200 or 14 per cent of the national total. The report acknowledged it was not necessary or desirable to immediately undertake all or most of the surveys, but that such investigations should be initiated as soon as practicable. The report described the two principal uses of the survey as preparing plans for development by the federal government or possibly in conjunction with private enterprise, and collecting data that private developers could use. In the area of irrigation, the report pointed out that federal irrigation projects heretofore had not harmed navigation and where private irrigation projects might affect navigation, the laws provided a means of settling the disputes without need for Congressional authority. The report recommended that the first investigations should be on streams the federal government might develop and should be done by the agencies which would undertake construction: the War Department for navigation and flood control; and the Department of the Interior for irrigation. Where power and navigation were concerned, the report advised that private interests possibly could assume the investigation of power resources, at no cost to the Federal Government.

Although the joint report of the Corps and the Federal Power Commission did not foresee conflict between the different uses of water resources, it also did not recognize the need for coordinated development by Government agencies. However, there was another, more immediate question of who

would undertake large construction projects. Early irrigation work by private, local and state entities had often proven uneconomical. After World War I, many commercial irrigation companies had failed or reduced their operations. Irrigators were unable to pay interest on their bonds, and the amount of irrigated land in the Pacific Northwest actually declined. Because private capital and local agencies were unable to plan and finance larger reclamation projects, the states looked toward the Federal Government, in particular the Reclamation Service, for technical assistance and funds. In the 1920s, the Service constructed and expanded several water storage projects in Oregon, Washington and Idaho. The Columbia Basin which contained the largest area of undeveloped farmland in the region was fertile but unsuitable for farming unless water from the Cascades, North Idaho or the Columbia could be diverted into the sagebrush basin. This area appeared to be the site for the next major undertaking in water resource development.³

In 1903, one year after its founding, the Reclamation Service (renamed the Bureau of Reclamation in 1923) made a reconnaissance survey of the basin. It studied a proposal to bring water through gravity feed from Pend Oreille River but decided this method would be too expensive. The State of Washington studied the problem in 1918, and in 1921 it engaged as a consultant for a second study, General George Goethals, a retiree of the Corps who was well known for his work on the Panama Canal. He recommended the gravity system, but others in central Washington were promoting a plan to store water behind a dam and pump it into irrigation canals. In 1923 Congress authorized the Bureau to investigate the proposed Columbia Basin irrigation project, appropriating \$100,000 for the study. The Secretary of the Interior appointed a special commission headed by Reclamation Engineer Homer J. Gault who completed a report in 1924 with the assistance of the Department of Agriculture and the United States Geological Survey. The report described two plans. One would use gravity feed to bring water through canals, tunnels and siphons from the Pend Oreille and Spokane rivers, and use the Spokane River and Coeur d'Alene Lake in Idaho for reserve storage. The other plan would pump water from a reservoir in Grand Coulee to be distributed through a canal system. After a board of engineers from the Bureau reviewed the Gault report, another commission was created to investigate both plans, submitting its report in 1925. This report recommended the gravity system which would irrigate over 1.2 million acres at a cost of \$58 an acre, for a total amount of \$193 million. However, the Bureau's commission advised that although the project was physically feasible, the proper time had not yet arrived for formulating a development program as costly and complex as this one. It cited lack of information and experience in undertaking projects of this type, especially in providing financial assistance and advice to new settlers, who were necessary components if the project were to succeed. Government aid would be essential to prevent land speculation and insure reasonable prices for an estimated 20,000 farms to be created in the basin.⁴

Washington state officials and its Congressional delegation backed the gravity plan as recommended by the Bureau's commission. Private power companies, in particular the Spokane-based Washington Water Power Company, vigorously supported gravity-fed canals. The pumping plan with its hydroelectric dam would compete with electricity from their own dams. In addition, surplus gravity canal water not needed for irrigation in the cold months could be diverted into

the Spokane River to augment water power for the private dams there. To its supporters, the pumping plan was a bold scheme for a monumental dam 400 feet high and 4,000 feet long. They believed its power could offset the costs of constructing the irrigation canals, and the whole system could be built on a unit-by-unit basis with power sales paying for the progressive development of the canals. In contrast, the gravity plan would not produce any revenues to offset the high construction costs of the elaborate system of canals, tunnels and siphons until all were completed. Moreover, Idaho, whose rivers and lakes had been included in the gravity plan as sources for supply and storage, balked at relinquishing its water rights for another state's project. Nor did Idaho farmers welcome competition from an additional reclamation project in the Northwest. Also, using natural mountain lakes for reservoirs would detract from their beauty.⁵

At first, the gravity proponents seemed to have the advantage, but as the battle continued, support began to swing toward the dam and reservoir. Even Washington Senators Wesley Jones and Clarence Dill, who previously had advocated the gravity plan, admitted that the pumping plan warranted a thorough investigation and consideration. They called for a careful study of both plans by an absolutely impartial board of able engineers and practical economists in order to ensure the best plan for the greatest irrigation project ever undertaken anywhere. In 1928 Jones introduced a bill for federal reclamation of the basin. The bill designated the Secretary of Interior to determine which was the better plan and to submit a report by the end of 1931. However, the bill failed in the House. Jones subsequently met with General Edgar Jadwin, Chief of Engineers, to urge investigation of the pumping plan. Nonetheless, his primary concern was to convince Congress to authorize and fund some type of federal reclamation project in the basin.⁶

With a debate raging over the gravity and pumping plans, politicians and other citizens looked to the upcoming survey by the Army Corps of Engineers as a means of obtaining a thorough and objective investigation. Both factions anxiously awaited the final reports that would decisively influence Congress and the Executive Office on the type of project to be authorized. The deteriorating national economy intensified interest in the investigations and a subsequent massive federal project to provide economic relief. The deciding argument would be that the pumping plan with a dam was more suitable for a reclamation project and easier to authorize, especially as it would avoid litigation over water rights with Idaho.

2. Work on the 308 Reports: Problems and Issues

The scope of the 308 Reports exceeded any planning or coordinated studies the Corps had ever undertaken in the West. The requirements of the survey, including flood control, hydroelectric power, power markets, competitive sources of power, navigation, irrigation, hydrology, rainfall, evaporation, stream flow, runoff, silt content and municipal water supply, strained the resources of the North Pacific Division. The person in charge of the surveys, 49-year-old Colonel Gustave Rudolf Lukesh, had been assigned as Division Engineer of Pacific Division in June 1925. In the summer of 1927, the Corps transferred him from San Francisco to Portland to be Division Engineer as well as District Engineer at Portland. His assistant and counterpart in the Seattle area, charged with the responsibility of surveying the Columbia River through the



Major John S. Butler

central Washington basin, was Major John Butler. In gathering data for the survey, Lukesh heavily relied on information collected from other federal and state agencies as well as data originating from the two district offices. In order to expedite the survey and minimize costs, field operations, explorations and plans were completed only for proposed construction sites except where decisions were needed between alternate sites.⁷

The first stage of the work was divided between Portland and Seattle Districts, with Seattle conducting the survey of the Columbia River above the mouth of the Snake River to the Canadian border, and Portland District handling the remaining territory. The Division Engineer supervised and coordinated the office and field work. These investigations concentrated on the main stem of the Columbia River and its minor tributaries; the Snake and Willamette reports came later.

The often frustrating job of gathering data from other agencies demonstrated the general lack of information on natural resources in the West. For instance, in 1930 Lukesh asked the Chief of Engineers for help in obtaining summary statements from the U.S. Geological Survey on mineral resources in Oregon, Washington and Idaho and within 100 miles of the Columbia watershed. Lukesh needed general information on economics, methods of development and power required to develop natural resources. A general map marked to identify the deposits would also be helpful, he added. However, the Geological Survey responded that it was "not disposed to give any assistance in this matter on the ground that the facts necessary for an inventory of mineral deposits do not exist." The Survey suggested that the Division try to obtain the data from the states.⁸

The Division, hampered by the absence of data, was further handicapped by the small size of its staff. The part-time division engineer was also district engineer for Portland, and the office staff which had doubled since Heurer's days, consisted of just a junior stenographer and a chief clerk.

They faced a monumental task of coordinating the information produced by the two districts into one report. Moreover, it was still uncertain which agency – the Corps or the Bureau – would provide irrigation data. When Jones introduced a bill in 1928 authorizing the Bureau to undertake studies of a Columbia Basin reclamation project, Butler suggested that the Bureau should prepare the data for the irrigation portion if it was to be the agency constructing the project.

Division Engineer Lukesh, eager to have the matter settled, agreed with Butler that House Document 308 provided for this contingency by stating that surveys should be done by the agency entrusted with the construction, “in the case of irrigation projects, the Department of the Interior.” After consulting with the Geological Survey, Chief of Engineers General Jadwin decided that the Columbia Basin project irrigation estimates should be a part of the Division’s report. Following some discussion about the difficulty of obtaining data from the Bureau, Jadwin, on Lukesh’s suggestion, set the policy for the basin studies: the report of investigation and survey of the Columbia River should not be delayed by perfecting the cost estimates, but should be submitted as accurately as possible in a separate form. “The Interior Department is not prepared to furnish any such estimate,” the Chief noted, and then added, “The prospect of early legislation on the Columbia is not known.” Therefore, nothing should “divert the District Engineer from the prosecution of studies assigned him.” Butler replied that the estimates were being sent forward that same date.⁹

Possible development of the Columbia River dominated public thinking in the region as Washington Congressmen pushed for authorization of the reclamation project even before the reports were completed. The lack of data proved to be a frustrating bottleneck. As pressure mounted for the report, Lukesh even attempted to purchase irrigation data from John Lewis, the former Oregon State Engineer. Lewis had prepared a report on the John Day Irrigation Project but did not receive full payment from the developers. Seeing an opportunity to obtain his money, Lewis offered the Division the report and data for \$19,000, a grand sum in 1929. The Division was interested because this report would save approximately \$5,000 in field and office work. Lewis quickly agreed to the bargain. There were some legal problems over ownership, but Lukesh felt a signed agreement would place the matter in the State Court if any questions should arise. Unfortunately for Lukesh, but perhaps best for the survey, the Chief denied the request.¹⁰

Not all contacts were unproductive. The Department of Commerce offered to help the Division collect data on electro-metallurgical and electro-chemical industries. In January 1930, the two agencies signed a cooperative agreement and suggested other contacts for the information.¹¹

Another major problem in completing the survey of the Basin was the lack of topographical maps. The Geological Survey’s inability to produce completed maps as quickly as desired thwarted the Division’s progress on the reports and frustrated those needing the 308 Reports to complete actual construction plans for a reclamation project. An estimate from a Bureau Engineer of \$500,000 and 3 years to produce maps inspired two hasty letters from Mark Woodruff of the Basin Irrigation League, which supported the gravity plan, to both Bureau of Reclamation Commissioner Elwood Mead and Major Butler. Could they reach an agreement to expedite the mapping? The solution on this phase of the data preparation

Map of Columbia Basin survey area

was to forego completed maps and to request that working contour maps of the more important features – reservoir areas and dam sites – be forwarded to the district engineer as soon as the Geological Survey completed them.¹²

The Division and districts struggled with negotiations for other types of data. Among these were information on silting needed to estimate the life of a reservoir; reservations for power sites, including present and future claims on the uses of water at those sites; and analyses of economic successes and failures of reclamation projects. All this was needed to determine the best plan. Since the Division faced the impending task of reconciling the district efforts into one coordinated plan, Lukesh sent detailed descriptions and instructions to the two district engineers. In addressing the concept of the best plan, Lukesh explained the difference between a plan that was feasible because of its engineering features or because it met the requirements for full utilization of the river’s resources, and one which was based on economic feasibility. There was, of course, the possibility that the best plan might not be practical or possible; in that event the defects must be clearly delineated. Lukesh emphasized that full weight must be given to all economic factors and listed five cost categories that must be considered and three that should be considered when appropriate. This stipulation held for whoever would finance the project, whether the Federal Government or private and state entities. In avoiding the relatively simplistic economic comparisons of freight rates by water versus those by rail which were relied upon in the past,



Lukesh grouped under one mandatory consideration capital, maintenance, depreciation, operations and interest, including amortization. For example, in analyzing the economics of navigation on the Columbia River above Vancouver where no common carriers operated, the costs of operating water craft were deemed as important as those for operating locks and dams. Freight tariffs with interest on investment were not sufficient. These criteria were to be applied to all features – irrigation, power development, and flood control – in addition to navigation.¹³

Lukesh intended that the economic analyses be complete and accurate, even if costs might demonstrate the plan to be uneconomical. "Our duty," he stated, "is to present a true picture." In handling the costs of the irrigation project, Lukesh decided that the Division report should include only the initial costs. He believed that Congress should determine the long-term costs to settlers in the reclaimed areas. The Chief's office agreed, but suggested that the irrigation analyses should include a "reasonably complete statement" of the charges the irrigators would have to meet under the alternative plans of financing.¹⁴

Facing this mass of data accumulating in the two districts as well as the task of harmonizing any discrepancies, Lukesh organized a liaison board with one representative from each district. The board would review the districts' drafts during the first part of June 1931, then meet the last part of the month to discuss inconsistencies and errors. Lukesh would be the final arbitrator. He cautioned the districts that criticisms should be strictly limited to common interests or matters that pertained to the Pacific Northwest. In the meantime the junior stenographer spent his evenings and holidays typing the final copy because the Division could not afford to hire another typist.¹⁵

Lukesh was able to pay consultants for expert advice. He undertook more surveys than first anticipated and extended others, the existing data being more meager than was first believed. Moreover, as Lukesh commented, "much of the Columbia River work is of such a controversial nature that a more careful consideration of the entire work has been necessary than was at first thought desirable."¹⁶

3. The Two Federal Agencies in the Columbia Basin

This first stage of the survey of the Columbia River and tributaries completed in 1931 initiated data collection from the field and from other agencies, and it produced an economic analysis of multiple purpose projects. By themselves, the surveys, analyses and reports probably would have caused unanticipated problems. But the complicating factor of the Columbia Basin reclamation project increased pressure on the Division. Politicians, state agencies, groups, and land and power interests convinced the Corps to change the original schedule so that the upper Columbia River surveys would be expanded and completed first. The demand for information to settle the heated dispute between the gravity and pumping plans accompanied the investigation during all its stages, increasing in intensity as parts of it became known to various groups or the press. Although this aspect of the preparation of the 308 Report is important in explaining the Division's decisive role in planning the final project, it also illustrates a unique relationship between two major agencies in the region. Although many assumptions have been made of the hostility or jealousy between the Corps and the Bureau, the relationships at the regional and field levels proved to be complex, if not harmonious at this time.

In beginning the surveys, the first issue confronting the Division was the Seattle District's schedule. The District compiled a list of six rivers and set tentative dates from March 31 to Oct. 31, 1929 for submitting the reports. Butler had placed the Columbia River sixth behind five rivers draining into Puget Sound, because of "its magnitude and importance and the need to obtain additional stream flow records." This priority was changed; first, by a circular letter of April 15, 1927, from the Chief which advised that streams should be investigated in the order of their importance, and then, by specific instructions from the Chief in November 1928 to submit the Columbia River preliminary report early in February 1929. Butler, of course, recognized that the upper Columbia River investigation was the most important single item because of the proposed irrigation project, but the catalyst for accelerating the investigation seems to have been the Congressional delegation. Senator Wesley Jones, Chairman of the Committee on Commerce and an active supporter of the dam-pumping plan, suggested to the Secretary of War that "Major Butler be instructed to take up the survey of the Columbia River and its tributaries first." After conferring with the Chief, the Secretary of War quickly assured the Senator that the Chief's office had proposed to push the Columbia River studies and fully appreciated the importance and the urgency. The Chief's office had sent its own assurance a week earlier, promising Jones that if Butler intended to delay the survey of the Columbia River, "necessary action would be taken to ensure that the survey of this river is prosecuted with a vigor commensurate with its importance."¹⁷

The irrigation supporters maintained close contact with the Chief throughout the early part of the surveys in hopes of expediting the survey and also of increasing its scope through special legislation. In early 1929, Senator Jones failed to get passage of his bill calling for a special study of the Columbia Basin irrigation project, giving equal attention to the gravity and pumping plans. Immediately afterward, Hervey Lindley, president of the Columbia Basin Irrigation League which supported the gravity plan, met with Chief Jadwin, Senator

Jones, the Interior Department, and the Washington Congressional Delegation to push for rapid execution of the Division's on-going surveys. Jadwin promised that the Columbia River studies would be pursued vigorously. Washington Representative John Summers also kept pressure on Jadwin. At Jones' suggestion, Jadwin agreed to focus first on the pumping plan because the gravity plan had already been given sufficient attention. Once that was done, Congress could decide which plan to adopt and introduce appropriate legislation. By recalculating Butler's figures, he reduced the estimate for the survey from \$2,503,600 to \$1,599,550. When combined with Portland District estimates for the Columbia River below the mouth of the Snake River, the new amount would be \$1,965,000. But this was still much above the original "308" estimate of \$734,100 for the surveys of the Columbia River above and below the mouth of the Snake River.¹⁸

Anticipating the consternation Butler's estimates would cause at the Chief's office, Lukesh explained that the discrepancy "must be due mainly to an altered conception in that district of the degree of refinement required in the work to be done in the 'project study'." As for himself, Lukesh contended, he had purposely not attempted to influence the district engineer in preparing the estimates, thinking it preferable that Butler's estimates be submitted as his own to the Chief with comments from the division engineer. If Butler's conception of the work needed in the project study of the Columbia River was correct, Lukesh would accordingly revise his more modest estimates. General Jadwin chastised both officers for the high estimates. His message to Butler tersely stated that the estimates were for detailed rather than general plans and were "considered very excessive." Jadwin recommended that Butler promptly submit a request for travel orders to find out what data were available in Denver, and that, if necessary, he temporarily employ engineers familiar with the information. The letter ended, "new estimates will be prepared and submitted without delay." And, indeed, Butler left immediately.¹⁹

The larger issue behind the estimates involved the relationship between the division and district offices, and how the division engineer perceived his duties. Jadwin's position was unequivocally clear. Although Lukesh had stated in his letter to Jadwin that, in effect, he did not supervise the district engineer in preparing the estimates, Corps' orders and regulations directed otherwise. The division engineer was to oversee the work of the districts and ensure that the work was executed "economically, efficiently, and in conformity with law and regulations."

Lukesh bristled at the charge that he had been remiss in his duties. He pointed out that he had "directed and coordinated" the work of the two districts, but had not been involved in the preparation of the actual figures. The division engineer's proper responsibility toward the district, Lukesh maintained, was advisory. The division engineer had neither the duty nor the right to direct the district engineer as to the opinions, conclusions or estimate figures used in the district's report. With such interference, the report would be the product of the division and not the district. If the district engineer were obliged to sign a report that reflected the division engineer's opinions and not his own, this would be a case of deception. What Lukesh had attempted to offer was a clear choice between the district's and the division's estimates.

Beseiged in his office by Washington State Congressmen and businessmen who wanted a quick and inexpensive investigation as a prelude to a hefty government project,

Jadwin needed an economical plan that satisfied the authority for the 308 Reports. A March letter from Senator Jones advised him that good weather had probably arrived by now in the Basin, in case he was not aware of the mild winters there, and could not the engineers begin their work immediately. "I am pleased to state," General Herbert Deakyne replied in Jadwin's stead, "that the Division Engineer has been instructed to undertake the project. . . and to expedite completion of the work in every possible way."²⁰

Butler's review of the Bureau's reports in Denver supported his conclusion that there was need for a more thorough, and consequently a more expensive, survey. His research reaffirmed the basic problems of a considerable diversity of opinion surrounding the opposing plans for the Basin and the inconclusive evidence due to a lack of suitable engineering data. Officials of the Bureau of Reclamation who, in Butler's opinion, were in a position to know the facts, had serious doubts. Not only did they believe that the country was not ready to develop the project, they also believed that economic feasibility could not be determined without complete topographic maps, detailed land classification, soil analysis, information on land settlement, and the effect of increased agricultural production on the nation's economy. Butler believed the most important unresolved question was the amount and distribution of the irrigable land in the project as estimates ranged from 1.0 to 1.8 million acres. This would have an important and decisive bearing on the construction costs, amount of water and size of canals.²¹

In the meantime, the Board of Engineers formally approved the project study of the Upper Columbia River on March 30, 1929, giving it priority on the basis of public interest in the Columbia Basin irrigation project. In addition to recommending new estimates, the Board recognized that as navigation improvements appeared to be far in the future, elaborate surveys for navigation studies were unnecessary. However, the Board deemed it desirable to include a discussion of the feasibility of adding locks to power dams and adding more data on flood protection in order to judge whether or not local protection would be justified. In agreeing with the Chief that new estimates must be submitted, the Board also concurred that surveys of minor tributaries should be excluded.²²

The ensuing pressures for completing the report increased tensions between the Chief's office and the Division. Each had its pressure groups and responsibilities. The timing of the report was the fulcrum of the issue, with the new Chief of Engineers, General Lytle Brown, urging that the report be pushed to completion at the earliest possible date. Although accuracy and thoroughness were not to be disregarded, Brown pointedly reminded Lukesh that Congress expected vigorous action and nothing should be left undone that would expedite the work. The issues between the offices were both technical and theoretical. According to Lukesh, the technical matters included a lack of efficiency and clarity in transmitting instructions to the Division, and the unrealistic demands upon Lukesh to serve as both Division and District Engineer. In the area of communications, for example, Lukesh explained that in interpreting the intent behind the language of the "308" recommendations, he had set a target date of October 31, 1931, for the report's completion as commensurate with the "308" directives. However, he subsequently received instructions to stress some portions over others. This example indicated, Lukesh respectfully suggested, a lack of understanding and guidance from the Chief's office. Much time had been wasted

in revising reports after they had been submitted. He requested that the office prepare a new circular on the surveys and project studies in place of the various instructions sent over the months to division and district offices.

As for serving in the dual positions at Portland, Lukesh pointed out how the detailed nature of the Portland District work greatly hampered his special assignment of coordinating and supervising the Columbia River project studies throughout the Division. The situation was an outcome of a policy that demanded detailed multi-purpose studies without appropriating the necessary funds. In his division the situation approached the impossible, for not only did he have two jobs, but two Portland district offices had previously handled the workload of the present single office. Lukesh calculated that with the burden of the "308s," the single District Engineer and his assistant had assumed four times the amount of work done by any previous district engineer. On top of this, of course, was the job of being Division Engineer. Mindful of his earlier rebuke from the Chief's office, Lukesh remarked how his supervision of the districts had been less than complete because of his double role. Another nagging personnel problem was the issue of finding suitable temporary professional help to shorten the length of time needed to collect data and prepare the report.²³

Lukesh, politely but firmly, maintained his difference of opinion with the Chief's Office. He also complained of setting the publication date to coincide with any factor other than the quality of the finished report. Quoting from a statement from the Chief's Office pertaining to the Cowlitz River, he asserted that the report should be the document to which any one seeking information about that stream would naturally refer. An example of this was vital water supply data that would take two seasons to collect because of abnormally low winter precipitation which would cause low summer flow. Another point of contention was Lukesh's view of the importance of the Basin Irrigation Project in relation to the "308" study. Lukesh was emphatic on this point that no single element should dominate the choice of data or completion date. This was Lukesh's determining factor, for in his opinion, the "so-called" Columbia Basin Project or Columbia Basin Irrigation Project was merely a part of the irrigation study which in turn was but a part of the comprehensive study. Lukesh promised that it would receive "its full measure of attention" but would not dictate the rest of the study.²⁴

Lukesh based his evaluation of the Basin's importance on a regional perspective broader than the proponents of the reclamation project envisioned. In the first place, problems within the two districts were decidedly different, due to the "308" authorization and instruction from the Chief's Office on tributary streams. On tributaries of the lower Columbia below the mouth of the Snake, independent surveys, as opposed to project studies, were being conducted which would give due prominence to issues in these water basins. However, on the upper Columbia River, the irrigation project study had usurped independent studies of power, storage and irrigation possibilities of the important tributaries. Instead, these streams were to be evaluated in terms of their effect on the flow of the Columbia, giving unjustified prominence to the main river above the Snake.²⁵

In downplaying the importance of the basin in the report, Lukesh also dismissed many of the claims of the supporters of the Columbia Basin Project. He viewed the Columbia Basin Project as the cherished hope of a small and active group with no direct personal concern in its completion but with interest

in promoting the commerce of their own communities. According to Lukesh, groups in eastern Washington around Spokane generated this enthusiasm; elsewhere, interest was much lower, especially in other irrigated sections in that part of the state. Further, the support from western Washington was, in Lukesh's opinion, due mostly to state loyalty. Farther away from Washington, other states had expressed their determination to curtail and not encourage reclamation. Personally, Lukesh foresaw greater influence on irrigation over the next 25 to 50 years coming from the smaller areas near the lower Columbia River than from the Basin. In view of this, he stressed that special care and effort should be taken "to secure facts of prospective growth, independent of the partisan sources of information."²⁶

Nevertheless, Lukesh bowed to the considerable demands on the Corps to produce the 308 Report in order to get on with construction. In fact, this matter of deadlines had been uppermost in Lukesh's mind. At a meeting with Butler, he and Lukesh agreed, probably reluctantly, to move the deadline up to July 1, 1931, depending on favorable weather and river conditions, with possible completion by February 1st.

The Chief's office accepted this plan of operation for the project study and referred Lukesh's complaint about serving as both district and division engineer to the personnel section. That office subsequently decided to appoint a new district engineer for Portland. In reply to Lukesh's request for a new circular of instructions, the Chief's office stated there was no need for one "since it appears that the district engineers in the North Pacific Division now understand what is desired." A note of irritation flashed through the polite language as the Chief remarked that "the other district engineers have been submitting satisfactory reports under the instructions already issued."²⁷

The redoubtable Senator Jones, unaware of Lukesh's reservations about the project he so heartily championed, continued to press for action on the completion of the Columbia Basin irrigation portion of the report with a letter to the Chief's office. General Brown asked Lukesh in late December to respond to Jones' query. Although most of Lukesh's information was duly transmitted to Jones, one observation was not. The letter from General Deakyne, the Acting Chief, quoted Lukesh in stating that in extent of superficial area, the irrigation project took first rank in the areas being studied, but it omitted the following sentence. "In other respects it is not the most important." Deakyne also informed Jones that the July date still held and that a separate report on irrigation in the Basin was not possible.²⁸

The dispute between the Chief's office and the Division in many respects constituted a private matter and disagreement over internal affairs. It could be viewed as the struggle of the Division Engineer to resist pressure from outside groups and individuals to telescope the preparation time of the report at the expense of its thoroughness. Lukesh's protest also signified sharp disagreement with the Chief's office over the importance of the basin irrigation project. Whereas these differences normally would be kept within the Corps and resolved through compromise by each party or direction from the Chief, the process of the "308s" raised intense public interest. The issues, revolving around the activities of the two agencies, the Corps and the Bureau of Reclamation, emerged abruptly and prominently with the first 308 Reports and became a continuing theme in the Pacific Northwest. Although the interpersonal dynamics of the relationship have not been fully documented or explored, many regional historians assert that

the two agencies battled fiercely over territory and construction of multiple purpose projects. In many respects, however, those outside the two agencies played important, if not decisive, roles in defining the issues and/or influencing the agencies.

There are substantial legal differences between the two agencies. The Corps must receive authority and funds from Congress to conduct surveys and construct or maintain projects. The Bureau of Reclamation, on the other hand, was created in 1901 (as part of the Interior Department) to encourage settlement of arid regions in the West. Unlike the Corps, the Bureau is not dependent on Congress for planning water projects although, in the first twenty years of its history, it was required to recoup the costs of its projects from irrigators and farmers. The Corps had not been under this type of obligation, and its critics charged that this exemption gave the Corps an unfair advantage. As water resource development moved toward multiple purpose development, the distinct line separating major responsibilities of the two agencies blurred. Moreover, in the 1920s the Bureau was suffering a decline because of opposition to opening up new farmland at a time of agricultural surpluses. Concurrently, there was also an important redirection within the Bureau toward undertaking large reclamation projects. In the late 1920s, the Bureau initiated work on the massive Boulder Canyon Project on the Colorado River which would combine hydroelectric production with irrigation. The idea of using power sales to help finance reclamation brought a new perspective to the Columbia Basin. The gravity plan became less attractive to the new Commissioner Elwood Mead, and with the Division involved in a thorough investigation of the basin, the Bureau reasserted its prerogative there. The Corps acknowledged that the Bureau would be the construction agency for whatever project was finally selected, but it insisted that it would carry out its studies with objectivity, avoiding pressure from either the gravity or pumping advocates. It maintained that it would not disclose its preferences or recommendations until the report was completed. Although Butler, Lukesh and the Chief's office assured the Bureau and Congress that they wished to cooperate fully with the Bureau, charges were hurled against the Corps complaining that it was infringing on the Bureau's work and duplicating its efforts.

In 1929 two members of Congress questioned the Corps' activities in the Basin. Representative Addison T. Smith, Chairman of the House Committee on Irrigation, and Representative Louis C. Cramton, member of Appropriations Committee and Chairman of the Interior Department Subcommittee, addressed inquiries to the Chief and the Secretary of War. Smith requested a statement on the duplication of engineering data; Cramton bluntly protested the interference of the War Department, as a military organization, in the Bureau's proper realm of irrigation. "The War Department has enough to do," he complained, "without taking over the function of the Department of the Interior." General Jadwin and Secretary of War James Good responded to the two Congressmen by citing the authority for the 308 Reports in the 1927 River and Harbor Bill and asserting their interest in cooperating with other agencies. Good added an assurance that the War Department had no desire to take over the functions of the Interior Department.²⁹

In the House, Cramton persisted in his criticism of the Corps and defense of the Bureau. His argument against the War Department's survey of the Basin pointed out that the Bureau received reimbursement for its work. He charged that the Corps' surveys were threatening the Interior Department's

cooperative relationship with state governments and portions of the civilian population. Nor, he claimed, were the field engineers behaving honestly. They were, in fact, obtaining records the Interior Department had gathered over the years without the prior knowledge and consent of the responsible heads of the Interior bureaus.

To strengthen his argument, Cramton cited a letter from Elwood Mead, Commissioner of the Bureau. "This interference is serious," Mead contended. "In one year the War Department has been given more money for irrigation investigations than has been appropriated for such investigation by the Reclamation Bureau in the last quarter of a century." Mead also testified that since the War Department did not require repayment of the investigation costs, the belief was growing throughout the West that construction of reservoirs should be transferred to the War Department because the Federal Government would pay. If this happened, irrigators would no longer pay their share of current projects. This was an "alluring prospect far more attractive" than Reclamation Bureau projects where valid contracts had to be signed and costs had to be repaid. Surprisingly, Mead claimed that there was no friction between the two agencies: both recognized that Congress had created a very difficult situation by appropriating money for the same work to two different Departments which had different conditions attached to their work. Butler responded immediately to Cramton's accusation of duplication of efforts. Butler and Lukesh had wrestled with the issue over a year ago, and Butler pointed out that they had suggested in December 1928 that the Bureau was the proper agency to submit estimates for the project study of the Basin, considering that it would be entrusted with construction. The Chief's office had told them go ahead with the estimates.³⁰

The possibilities of an interagency squabble prompted irrigation supporters to arrange a meeting between Butler and Mead. This meeting would signify cooperative spirit, iron out some problems – in particular the topographic surveys – and point attention where it belonged, on the plans and construction of the project. In this matter Roy Gill, a Spokane businessman and executive of the Columbia Basin Irrigation League which supported the gravity plan, wrote directly to Major Butler. Mead was planning a personal inspection of the basin project, and Gill pressed Butler to join the tour. Butler first declined, but Gill persisted, stating, "I know you desire to cooperate with the Reclamation Department to the fullest possible extent." The meeting took place on the evening of August 8. During the meeting, a smoker given in honor of Mead and the Bureau's chief engineer, W. F. Walter, Butler gave a talk referring to Mead's letter in the *Congressional Record*. They then discussed what the Corps was doing and how the Bureau could best spend its recent \$50,000 appropriation to avoid duplications. Backers of the irrigation project, headed by Gill, suggested a joint report. Butler interpreted this request as indicating the Bureau's interest in the pumping and dam plan as a means of financing the construction; the same method of financing used with the Bureau's new Boulder Dam project on the Colorado.³¹

Later Lukesh agreed with Butler that a joint report was neither desirable nor possible this late in the survey. Earlier he had resisted pressure to emphasize the Columbia Basin project study at the expense of the total survey, and he believed a joint report would distort the Division's own study and report. He did not want the Bureau's advocacy of irrigation to take precedence over his intentions to produce a

balanced plan for the utilization and control of the waters of the entire Columbia, upper and lower, with full consideration of navigation, power development, flood control and irrigation. However, Lukesh did favor full cooperation with the Bureau and agreed with Butler's recommendation that the two agencies should keep each other informed. The Chief's Office, agreeing with Butler and Lukesh, added specific directions for the free interchange of information and plans, with no reservations to be made in the use of information. It directed that above all there must be no overlapping in the work of the two agencies or duplication of effort, and if duplication became apparent, it would be eradicated at once by appropriate action.³²

The Chief's office instructed Lukesh to prepare data for Mead on the surveys relating to irrigation on the upper and lower Columbia River. The result was an eleven-page statement describing in some detail the relationship of irrigation to the "308" studies and the status of the investigations. Along with the information, Lukesh made careful note of cooperation requested and received from the Bureau.³³

Mead's interest in the Columbia Basin project, a departure from the Bureau's previous position, increased the tempo of the irrigation campaign. Mead assigned Harry W. Bashore, a reclamation engineer who became commissioner in 1943, to supervise a review of public and private reports on reclaiming the Columbia Basin and to present a recommendation. That, along with the historic meeting in Wenatchee between Mead and Butler, elicited requests from Washington Senators Jones and Dill that the cooperation be encouraged. Jones urged Secretary of War Patrick Hurley to meet with Mead; and Dill again raised the question of a joint report. Lukesh declined for the same reasons, but he suspected that the pro-gravity group was behind the senators' requests. In case the Corps did not recommend an irrigation project, a joint report with the Bureau's advocacy of irrigation would offset this finding. Mead's visit to the Basin heightened expectations for the reclamation project. With rumors circulating about the final recommendation, Mead formally requested the Columbia Irrigation League and newspaper editors to suspend their speculations and wait for the final reports. In the meantime, the Division directed that Bashore be furnished with all available records and data relating to the irrigation project with the stipulation that his report acknowledge the source and that he forward his report and new data to Butler.³⁴

The Bureau also desired to promote cooperation. In mid-October, Elwood Mead assured Secretary of War Hurley that he and Chief of Engineers General Brown had reached an understanding that would avert as far as possible "all danger of injurious controversy over conclusions" of the agencies' reports. Despite the climate of cooperation, Mead still felt uneasy about the Corps' role in investigating the Basin, and he wondered what the Bureau's responsibility should be while it waited for information and the final report. At Brown's suggestion Mead agreed to review the completed report before its final adoption by the Corps. Mead was not worried that the Corps would attempt to construct the project. In his opinion, any danger menacing the two independent agencies was a result of others playing off the War Department against the Reclamation Bureau. Secretary of Interior Wilbur echoed Mead's fears of overlapping responsibilities. "It is always difficult to administer the law satisfactorily," he wrote to Senator Jones, "when authority is given to one branch of the government to perform the natural functions of another branch."³⁵

Nonetheless, Mr. Bashore's presence in the Columbia Basin created some difficulty for the Division which was attempting to maintain its objectivity. Bashore accompanied Mark Woodruff, the Secretary of the Columbia Basin Committee of the pro-gravity Spokane Chamber of Commerce, to Coeur d'Alene. Meeting with 24 members of the town's chamber of commerce, Bashore convinced the merchants that the Columbia Basin project would not seek storage in their lake. He and Woodruff hoped this would convince Idaho to join with other states in allocating water for a gravity irrigation project. The assurance implied that the Corps' report had already discounted the gravity plan as an option. Butler and Lukesh immediately denied the statement and affirmed that all plans, including storage on Lake Coeur d'Alene, were still under consideration. Butler asked the Bureau to advise him if it had any information he had not uncovered, and Lukesh protested that the Bureau had not notified him of any intentions to recommend against the gravity plan.

The Chief suggested a conference as a means of determining what was behind Bashore's statement. Butler arranged one on November 4 with Bashore and Woodruff, the two who had released information to the press. It was a polite confrontation. Bashore agreed that the storage plan was still being considered and that he had no additional information. After some discussion, Woodruff admitted he had probably made a mistake in issuing the statement which was intended to soothe the North Idaho businessmen opposed to using the Lake as a reservoir. In Butler's opinion, the conference succeeded in suppressing the rumor and establishing a rapport with the Bureau's field representative. For a time Butler could breathe more easily. The surveys were progressing well, and a consulting engineer with the Bureau had recently praised his work as a perfectly unbiased attempt to present all the factors needed to decide upon the best method of using the water of the Columbia and its tributaries for the reclamation of the Columbia Basin tract. Despite this understanding, the Bureau was not prepared to authorize a working agreement between Butler and Bashore even though Lukesh offered to make data available.³⁶

The hope that the Corps and Bureau could avoid public criticism for duplication of work, or at least confine adverse remarks to Congress and local gatherings, proved futile. Curiosity about an immense irrigation project involving two competing federal agencies became the subject of an article in the October 9, 1930, issue of *Engineering-News-Record*. This article warned that unless President Hoover acted, separate engineering reports would be prepared on the controversial Columbia Basin project. "Friction already is evident," the article continued, "and reports with conflicting findings are in prospect, but steps may be taken to coordinate the work." Lukesh had been worried about the effect of reports and speculations of rivalry between the Bureau and the War Department. Now, in a personal letter to Brig. General G. B. Pillsbury, Assistant Chief of Engineers, he expressed these concerns. "There has been and is absolutely no friction so far as I know," Lukesh stated, "and I believe myself to be well informed." However, since the beginning of work on the "308" surveys on the Columbia, Lukesh had felt that the Engineer Department was treading on dangerous ground and he wished to avoid trouble. The district engineers who shared his concern also attempted to prevent trouble. "I feared that an explosion might be a not unlikely occurrence," Lukesh candidly admitted, "on such streams (where) . . . the Engineer

Department, . . . might be considered to be an interloper into the functions of the Bureau of Reclamation. That it was by Act of Congress that Document 308 work is under the Engineer Department would not necessarily prevent such feelings." As for the future, Lukesh worried that another explosion would occur, "the powder train may be forming."

4. Completing The Report and Return of Good Will

As the report neared the completion date of July 1931, irrigation groups strove to present a united front of Bureau and Corps engineers to Congress. Senator Jones and Representative Hill informed Commissioner Elwood Mead, in April of 1931, that the Chief of Engineers had assured them that he would gladly confer with Bureau representatives about a joint recommendation in relation to the irrigation project. This would be transmitted to Congress with the 308 Report after review by the Board of Engineers.³⁷

The Chief's office had assured Mead in December 1930, that he would have an opportunity to comment on irrigation features as the reports were finalized. However, Mead was not able or willing to make such a review, and in January 1931, the Bureau requested that the Corps withhold the reports. Mead, surprised and perhaps irritated to receive 2500 uninvited typescript pages with a request for his review and recommendations, assured General Brown that it would be entirely satisfactory if the Corps submitted the report without the Bureau's comments. Although he would be happy to comply with the Chief's request, the Bureau had neither funds nor the engineers and economists to carry out a task that would take weeks and perhaps months. The report did impress him, however, as a very comprehensive and thorough treatment based on careful investigation and study. Brown later conceded to Jones that although he agreed the report should carry recommendations of both the War Department and the Bureau, he was at a loss to know how this could be accomplished without the Interior Secretary initiating the act.³⁸

When the Division submitted the report on July 31, it transferred the issues to the Chief's office and the Board of Engineers who were to review it next. The abrupt merger of the North Pacific Division into the Pacific Division and the transfer of the Office to San Francisco on August 1, 1931, removed the Division even further from the report. This coincided with the end of Lukesh's term as Division Engineer, and he moved on to become Division and District Engineer in New York and a member of the Board of Engineers. The new Division Engineer, Colonel Thomas M. Robins, who had been Division Engineer of the South Pacific Division since 1929, now assumed command of the combined division. Although the reasons for the consolidation at the onset of the national depression were purportedly economic, expenditures in the Pacific Northwest were \$2,279,000 in 1930, and increased to \$3,023,000 in 1931.³⁹

From his headquarters in San Francisco, Robins oversaw the final cooperative efforts leading to authorization of the Grand Coulee project. In mid-October 1931, he traveled to Spokane for a meeting with the Reclamation Board of Engineers, the new Seattle District Engineer Colonel Clarence Lynn Sturdevant, and several civilian assistant engineers. Major Butler, who had been reassigned in September to the Headquarters of the Seventh Corps area in Omaha, was sent to advise the group. The Bureau was eager to receive the Corps' assistance. After a full discussion of the Engineer's report and

a trip to examine potential dam sites, Robins returned to San Francisco leaving Major Butler to continue inspections of the Basin with the Reclamation Engineers. The conference concluded a week later in Seattle where the party examined the data and records prepared for the report. The Seattle District agreed to assign engineer Charles Smith to assist in revising estimates on the irrigation project. From the October meeting, Robins had ascertained that the Bureau intended to prepare a report as the basis for legislation authorizing a reclamation project to include Grand Coulee Dam. Fortunately for the Bureau, the information gathered by the Corps was sufficient for this purpose with the exception of a few, small studies. Butler's report of the conference added that the Columbia Basin Irrigation League now backed the pumping plan. The Bureau's agreement with the major conclusions of the Corps' report, signaled the general acceptance of the project for a power dam and for pumping water from the Grand Coulee into the canals.⁴⁰

The success of the conference in furthering cooperation with the Army Engineers satisfied Mead who forwarded Bashore's report of the meeting to General Brown. Bashore commented in the letter that the Army Engineers had

"manifested a willingness and desire to cooperate in any reasonable way to secure further data or make available any information which they had gathered." A second postscript to the patient and persistent efforts to avoid the explosion and halt the "powder train" Lukesh once had feared came in a gracious letter to General Brown from Commissioner Mead. Mead sent the Bureau's completed report to Brown with his appreciation for the cooperation of the War Department. The final result of the two surveys was an agreement on the important conclusions, and Mead acknowledged that the Bureau's report was largely based on the Division's "308" study. Mead praised the uniform courtesy and cooperation of the Chief and his associates – Colonel Robins, Major Butler, Colonel Sturdevant and others. He commended the 308 Report for its systematic and orderly arrangements, supporting data, and the thoroughness and the skill of its compilers. Brown returned Mead's compliment, thanking him for the cooperation extended by the personnel of his Department, and for the kind remarks directed at the district and division officers. Perhaps most of all, General Brown was pleased that the reports of both agencies were in agreement; the alternative might have ignited the powder train in the Columbia River.⁴¹

CHAPTER 3. ENDNOTES

1. Swain, *Federal Conservation Policy*, pp. 100–01; Hoover quoted in U.S. Congress, House Report No. 872, 70th Cong., 1st sess., 10 March 1928.
2. Act of March 3, 1925, Par. 3, 43 Stat. 1186, 1190. Congress excluded the Colorado River from the Survey as the Bureau of Reclamation had been authorized to develop it.
3. U.S. Congress, House Document 308, *Estimate of Cost of Examinations, etc., of Streams Where Power Development Appears Feasible*, Letter of Chairman, Federal Power Commission and Chief of Engineers, 12 April 1926, 59th Cong., 1st sess., hereafter cited as House Document 308; Dorothy O. Johansen and Charles M. Gates, *Empire of the Columbia*, (New York: Harper and Row, 1957), pp. 587–92.
4. U.S. Congress, Senate Committee on Irrigation and Reclamation, *Columbia Basin Project*, 69th Cong., 2nd sess. (Washington, D.C.: Government Printing Office, 1927), pp. 2–3, 59. This report includes the Gault report of March 1924, two reports by the Columbia Basin Board of Engineers, Interior Department, Bureau of Reclamation, April 1924 and Feb. 1925, and Report of the Special Commission on the proposed Columbia Basin Project, 25 August 1925.
5. W. G. Swendsen, *Special Report on the Allocation of Columbia Water Supply* (Boise: Idaho State Department of Reclamation, 12 Jan. 1927), pp. 5–6.
6. U.S. Congress, Senate Report 345, Senate Committee on Irrigation and Reclamation, *Columbia Basin Reclamation Project*, 70th Cong., 1st sess., 1928; Roy Gill, Chairman of Columbia Basin Irrigation League to Hoover, 2 April 1929, RG 77, NA, 111, 7249/42. For a complete and lively history of the Grand Coulee project, see George Sundborg, *Hail Columbia: The Thirty-Year Struggle for Grand Coulee Dam* (New York: Macmillan Co., 1954).
7. U.S. Congress, House Document 103, *Columbia River and Minor Tributaries*, 1933, 73rd Cong., 1st sess., p. 21; William Willingham, *Army Engineers and the Development of Oregon*, pp. 93–95.
8. Lukesh to Chief, 21 Feb. 1930, and Chief to Lukesh, 27 March 1930, RG 77, Seattle Federal Archives and Records Center, 501 NPD, HD 308, 308A and 308B, Vol. 1, hereafter, Seattle FARC.
9. House Document 308, p. 6; Butler to Chief, 14 Dec. 1928; Lukesh 15 Dec. 1928; Jadwin to Butler 10 Jan. 1929; Butler to Chief, 18 Jan. 1929; Lukesh to Chief, 19 Jan. 1929; Jadwin to Butler, 7 Feb. 1929; and Butler to Jadwin, 5 March 1929, all endorsements to the letter of 14 Dec. 1928, RG 77, NA, 111, 7249/12.
10. Lukesh to Chief, 14 June 1930, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 3.
11. Maj. Gen. Lytle Brown, Chief of Engineers to A. Lane Crier, Chief, Transportation Division, Commerce Dept., 27 Jan. 1930 and reply of William Cooper, Commerce Dept. to Brown, 4 Feb. 1930, RG 77, NA, 111, 7294/75.
12. Woodruff to Mead and Butler, 17 Feb. 1930; Butler to Chief, 24 Feb. 1930 with endorsement by Lukesh, 25 Feb. 1930, *ibid*, 7249/76/1–2 and /2; Lt. Col. John J. Krigman, OCE to Geological Survey, 12 Sept. 1930, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 3.
13. Lt. Col. Daley, OCE to Lukesh, 10 July 1930, *ibid*; Lukesh to Portland District Engineer, 22 Oct. 1930, Lukesh to Bertha Nienbury, Economic Consultant, 26 Dec. 1930, *ibid*, Vol. 5. Lukesh had been relieved of his assignment as Portland District Engineer on July 27. He remained as Division Engineer until 1 Aug. 1931, when Col. Robins was appointed as Division Engineer of the recombined North Pacific and Pacific Division.
14. Lukesh to District Engineers and the Chief, 22 Dec. 1930; endorsement of Chief's Office to Lukesh, 6 Jan. 1931, *ibid*.
15. Lukesh to District Engineers, 29 May 1931, *ibid*, Vol. 7.
16. Lukesh to Chief, 5 March 1931, RG 77, NA, 111, 7249/120; Roy Scheufele, *The History of the North Pacific Division, 1885 to 1965* (Portland: North Pacific Division, n.d.), p. 7.
17. Jones to Secretary of War Hurley, 15 Jan. 1929; Butler to Chief, 28 Jan. 1929, Butler to Chief, 26 Dec. 1928; Secretary of War Davis to Jones 12 Feb. 1929, and Brig. Gen. Deakne to Jones, 22 Jan. 1929, RG 77, NA, 111, 7249/18, /20/ and /22. Chief of Engineers General Jadwin also sent a letter to Washington Representative John Summers assuring him that the proposed Columbia Basin irrigation project was the “most important single item in the entire study.” Jadwin to Summers, 18 Jan. 1929, *ibid*, 7249/22.
18. Lindley to Waller of Washington State College, 26 Feb. 1929; Jadwin to Lindley, 9 March 1929; Summers to Jadwin, 1 March 1929, with letter of Clapp to Summers of 25 Feb. 1929, *ibid*, 7249/33/1.
19. Butler to Chief, 5 March 1929 with endorsement from Lukesh of 7 March, *ibid*, 7249/34.

20. Jones to Jadwin, 26 March 1929; Deakyne to Jones 8 April 1929; and Lukesh to Chief, 4 May 1929, *ibid*, 7249/37 and /40. The revised estimate of \$270,000 from Butler, a reduction of over \$2 million, was forwarded from the Division to the Chief's Office on May 4. This drastic revision was accomplished by eliminating or curtailing field and office work on several tributaries.
21. Jadwin to Butler and Lukesh, 18 March and 4 May 1929; Butler to Jadwin, 18 March and 2 May 1929, *ibid*, 7249/46.
22. Deakyne to Jadwin, 30 March 1929, *ibid*, 7249/25.
23. Lukesh's position on the report and his duties are outlined in his six-page letter to Gen. Brown, 25 Nov. 1929, *ibid*, 7249/69.
24. *Ibid*.
25. *Ibid*.
26. *Ibid*.
27. Brown to Lukesh, 31 Oct. and 25 Nov. 1929 and endorsement for Major Daley of the OCE, 6 Dec. 1929, *ibid*, 7249/68, /69.
28. Jones to Brown, 16 Dec. 1929 with endorsement from Lukesh, 31 Dec. 1929; Deakyne to Jones, 13 Jan. 1930, *ibid*, 7249/72.
29. Smith to Jadwin, 25 Jan. 1929, and Cramton to Good, 15 April 1929, *ibid*, 7249/19, /43.
30. U.S. Congress, House, "Duplication of Activities by the War Department and the Bureau of Reclamation," 71st Cong., 2nd sess., 27 June 1930, *Congressional Record*, 11922; Butler to Chief, 3 July 1930, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 3; Butler to Chief 14 Dec. 1928 with endorsement from Lukesh of 15 Dec., RG 77, NA, 111, 7249/12.
31. Butler to Gill, 28 July 1930; Gill to Butler, 29 July 1930; Butler to Gill, 13 Aug. 1930, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 3.
32. Butler to Mead, 11 Aug. 1930 with endorsement by Lukesh, 12 Aug. 1930, and endorsement from the Chief's Office, 3 Sept. 1930, *ibid*, Vol. 4.
33. Kingman, OCE to Lukesh, 27 August 1930, and Report from NPD, 15 Sept. 1930, *ibid*.
34. Mead to Secretary of the Interior, 14 Oct. 1930, Lukesh to Pillsburg, 17 Oct. 1930, and Butler to Chief, 2 Sept. 1930 with endorsement of Lukesh, 6 Sept. 1930, and letter of Gill to Trustees of Columbia Basin Irrigation League and newspaper editors, 28 Aug. 1930, *ibid*; Jones to Hurley, 2 Oct. 1930, Dill to Hurley, 13 Oct. 1930, RG 77, NA, 111, 7249/97, /100. Jones sent a similar letter urging cooperation to Ray Wilbur, Secretary of Interior, dated 2 Oct. 1930, in RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 5.
35. Mead to Wilbur, 14 Oct. 1930, and Wilbur to Jones, 15 Oct. 1930, *ibid*.
36. Minutes, Columbia Basin Committee of the Spokane Chamber of Commerce, 2 Oct. 1930, Butler to Chief, 4 Oct. 1930 and endorsement of Lukesh Oct. 6 and Chief to Lukesh, 16 Oct. 1930; and confidential endorsement of Butler to Chief, 7 Nov. 1930, *ibid*.
37. Jones and Hill to Mead, 18 April 1931, RG 77, NA, 111, 7249/125/1.
38. Mead to Brown, 25 Aug. 1931, Brown to Mead, 2 Sept. 1931, and Brown to Jones, 1 Sept. 1931, *ibid*, 7249/151.
39. Scheufele, *History of the North Pacific Division*, p. 7.
40. Robins to Chief, 22 Oct. 1931, Butler to Chief, 28 Oct. 1931, RG 77, NA, 111, 7249/185, /189.
41. Mead to Brown, 13 Jan. 1932, and Brown to Mead, 15 Jan. 1932, *ibid*, 7249/205.

IV

BONNEVILLE DAM: BEGINNING THE PROJECTS



"Is was as though a huge transit had been set up with a mighty lens capable of bringing the Columbia under the scrutiny of one man. Visions were beginning to take tangible forms."

Seattle Daily Times,
July 20, 1930,
Describing the 308 Report



Baker Bay in 1885. View from Cannery Hill toward the Elmore and Seaberg Canneries.

1. Introduction

The first 308 Report, published as House Document 103 in 1933, marked a turning point for the Division as a major water resource planning agency in the United States.¹ Producing a comprehensive planning document meant that the Division, and the Corps as a whole, assumed the responsibility for major decisions on the development of the Columbia River system. Those interested in the feasibility of building dams or improving channels – politicians, local interests and regional development groups – had to contend with the conclusions of the 308 Reports. Presumably, construction of dams could have been undertaken without the Corps' support. However, the thoroughness and accuracy of the data collected in the "308" investigations and the concurrence of a majority of Congressmen with the basic conclusions, gave the report an authority that advocates for immediate development had to recognize. Although the Corps' reports had previously furnished basic data on water resources and commerce in the Pacific Northwest, the Columbia River and Tributaries 308 Report far exceeded all earlier examinations and surveys. In fact, the 1932 report furnished a basis for subsequent reviews and hearings, initiating a process that continually updated the plans in light of new events, such as the need for additional hydropower production during World War II. That review process has continued to the present.

The basic issues of the first report, House Document 103, concerned first, the economic feasibility of constructing dams with hydropower facilities in a sparsely populated area with few markets for power and, second, providing continuous navigation on the middle Columbia and lower Snake where river commerce had almost disappeared. While there were regional demands to open the interior through its waterways, division engineers cautioned that development must await population growth and the revival of interest in river navigation.

National political exigencies overrode these conservative positions, and Bonneville and Grand Coulee were authorized by newly elected President Franklin D. Roosevelt, through the Public Works Administration, as a means of putting people to work during the Depression. Planning in the early 1930s, therefore, combined sober evaluation and prudence with the excitement of the New Deal. The result was two huge concrete structures on the Columbia River. Bonneville and Grand Coulee dams ushered in a new era of hydroelectricity and slack water navigation on the Columbia River system, but they also brought to the region new controversies centering on the wisdom of taming a free-flowing river and consequently threatening anadromous fish runs.

2. Anticipating the Report

With the existing controversies over the type of irrigation development in the Columbia River Basin – gravity feed or pumping – anticipation of the Division's report and recommendations increased. All factions acknowledged that the report would effectively determine the pattern of water resource development in the region, and many expected a strong recommendation for a massive reclamation project. The river as a golden asset for Washington's future. earliest comments by Seattle newspapers gloated over the prospect of increased prosperity for the state. In July 1930, even before the surveys had been completed, the Seattle *Daily Times* informed its readers that the Columbia survey established the

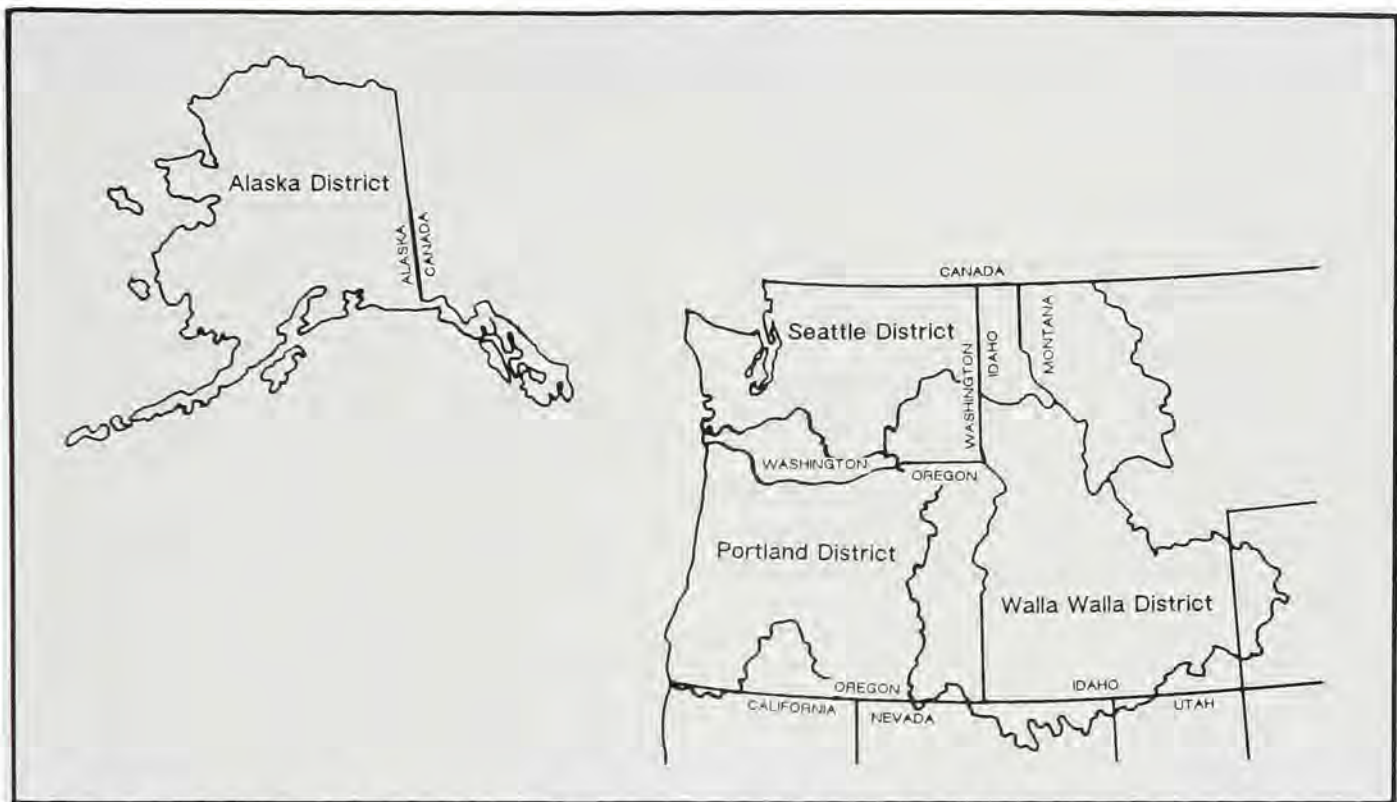
North Pacific Division Map

Moreover, the "dreams of the empire builders," it continued, "would be advanced a long step toward reality with the publication of the report." The editor of the *Post-Intelligencer* also anticipated the healthy effect of a federally sanctioned and funded reclamation and power project on the state's economy.

He enthusiastically described the "vast army of workers demanding great quantities of food, clothing and shelter and millions of dollars worth of raw materials and manufactured products," and he looked ahead to the great influence of a developed and productive Columbia Basin upon Washington's destiny as a manufacturing center.²

As portions of the report became known, the Division received numerous requests for access to it, although the contents were intended to remain confidential until reviewed by the Board of Engineers and the Chief's Office. In 1930 the Office had advised that power companies could review the report. Following its completion in July 1931, the Chief also approved giving Congressmen an opportunity to examine it. They were expected to keep the conclusions confidential. Copies were deposited at the district offices where Congressional delegations could read the report's conclusions. This "confidential" use of the reports raised important issues. There was, of course, no way of keeping information from the press and other groups, especially in the Columbia Basin where pumpers and gravity proponents anxiously waited for the results that would influence support for their projects.

The fact that only selected people were able to read the report distressed Oregon Senator Charles McNary, the Chairman of the Committee on Agriculture and Forestry. He quoted from a letter of R. H. Kipp, Executive Vice-President of the influential Columbia Valley Association in Portland. In that letter Kipp explained to the Board of Engineers, "The people here interested in the river, feel that since the Engineers have given publicity in the way of a ruling on certain major features, and those interested at this end are offered an opportunity of appearing before the Board, they



should all have the opportunity of knowing in detail what the report contains." McNary noted that while some individuals could read the reports and a few large newspapers had even published parts of it, most other people and owners of small newspapers had not been allowed to see it. He suggested that the Board should order the report opened for the general public in order to stop groundless rumors. The Chief responded by requesting Colonel Robins in San Francisco and Majors Oscar Kuentz and Clarence Sturdevant of the Portland and Seattle Districts respectively, "to afford all responsible individuals who may present themselves opportunity to read the report at any of the [three] offices." Each office was to keep a list of users' names and addresses, perhaps as a means of insuring confidentiality.³

The two controversial aspects of the report were its preference for the pumping plan and its hesitancy to support a large power development in the Basin without a guarantee of power markets. These two points ignited demands by interested parties, like Kipp, to read the report in order to anticipate its effect on the region's power interests. In 1930 Major Butler had attempted to forestall the conflict by explaining to the *Seattle Daily Times* that the Engineers would give Congress full information on the best scheme for the greatest and most economical benefits of the river's vast potentialities. He stressed that the essential question would be what role private and federal agencies would assume in the development of the Columbia and where the power would be marketed. By September 1931, the *Seattle* newspapers were reporting that the report revealed that the gravity plan had been abandoned in favor of a huge power development and that the state might be asked to bear a substantial part of the costs.⁴

At this time, the type of power and reclamation project to be built took precedence over who should fund it. There were two strong factions. The Columbia River Development League headed by James O'Sullivan and Rufus Woods, editor

of the *Wenatchee Daily World*, favored the dam and the pumping plan. The Columbia Basin Irrigation League and Spokane power interests represented those who wished to reserve power sites for private developers. These two contending opinions created an undercurrent within a larger issue: which federal agency should have the authority to develop the Basin, the Bureau of Reclamation or the Corps of Engineers? The Spokane interests preferred a reclamation, non-power project. Although approached by the pumpers to help their cause, the Division apparently maintained a careful distance from this issue. In September 1931, James O'Sullivan wrote to Major Butler, who had since been transferred to the Engineer Office in Omaha, with the alarming news that the gravity advocates were in collusion with the Bureau of Reclamation to discredit the Division's report. He contended that they were attempting to convince the public that they would have to substantially underwrite the pumping project through heavy taxation. O'Sullivan warned that unless someone, like himself, was allowed to read the 308 Report – without disclosing its contents – Spokane public opinion would be turned against it. Assuring Major Butler that the Columbia River Development League was solidly behind the Army, O'Sullivan suggested that the Army recommend building Grand Coulee as the first stage of developing the Columbia River. This, he believed, would insure that the Corps would be selected as the construction agency, leaving the Reclamation Service high and dry. A few days later, O'Sullivan's colleague, Rufus Woods, President of the Columbia River Development League, called on General Brown in Washington, D.C., with a similar message.⁵

O'Sullivan's opponents, led by Roy Gill of the Columbia Basin Irrigation League, were wary of openly opposing the Corps' report which favored the power dam. Gill telegraphed the President of the Irrigation League on September 24, with the request, "please urge our people including newspapers to lay off Butler report and wait for announcement of plan by

Reclamation Department at proper time." Shortly after that, Bureau of Reclamation representatives met with Colonel Robins, Major Butler and Major Sturdevant as a prelude to the Bureau's own report on the Columbia Basin irrigation project. This report was largely based on Butler's report which had been forwarded to the Bureau prior to this October meeting. According to Butler, the Bureau was interested only in the pumping plan. He also noted that one outstanding feature of this entire subject was the abrupt change in the position of the Columbia Basin Irrigation League, under Roy Gill, which now backed the pumping plan after so many years of opposition.⁶

Within the Corps, opinions differed on the wisdom of the Federal Government undertaking a major power project on the Columbia. Major Butler strongly advocated Grand Coulee Dam. According to Rufus Woods, he traveled to Portland with his staff to defend his report and its recommendation for a high dam. After a week of questioning by the Division, and resisting pressure to change his views, he is purported to have said, "That, gentlemen, is my report." Colonel Lukesh did not agree with Butler and Portland District Engineer Major Kuentz who advised that the government immediately begin constructing works like Grand Coulee in order to stimulate the region's economy. According to Roy Scheufele, a long-time executive staff member of the Division, Colonel Lukesh was an astute man but somewhat lacking in creative imagination and vision. He believed that the need for the projects lay far in the future. Nor were Lukesh's successor, Colonel Thomas Robins and his assistant C. I. Grimm as optimistic as Butler and Sturdevant. After touring the project site in October 1931, Robins and Grimm agreed that Butler's estimates on the growth of power markets in the region were too high. This reassessment devastated the Grand Coulee supporters. Unless Congress believed there would be markets for new power, it might not be willing to authorize and fund Grand Coulee or any other projects on the Columbia.⁷

In mid-December 1931, the Board of Engineers reviewed the Division's report, but disagreed with Butler's optimism. It was unable to recommend adopting any improvement project, either solely for navigation or for navigation in combination with power and irrigation. Although the Board wished to protect the report's confidentiality, it realized that its recommendation would have a great impact in the Pacific Northwest. It immediately sent notices to the Congressional delegations of Washington and Oregon and others explaining the important features concerning future development of the Columbia. It invited comments and stated it was willing to organize a public hearing, subsequently held February 1.⁸

By this time, the major components of the report relating to power development were known. Senator Frederick Steiwer of Oregon advised General Brown that the report should be released to avoid popular misunderstanding of its contents concerning navigation and a proposed power project at The Dalles. The Mid-Columbia River Association had warned Steiwer that "Hold up of report in this manner assumes appearances to people as an act of suppression. Information is resulting in confusion and division over matters not accurately known. People emphatic in demand for this development and willing to assume aggressive action . . ." Portland was also eager to have the report released. W. D. B. Dodson, manager of the Portland Chamber of Commerce, suggested to Senator McNary that in view of the delay in getting the report out, the Corps' Portland Office should retain a civilian engineer to further analyze the power possibilities of the Columbia River. General Brown agreed, and instructed Robins accordingly.⁹

Pressures from the Pacific Northwest for the release and publication of the 308 Report reached a climax with Steiwer's unsolicited advice to General Brown in February 1932. Convinced that Hoover's statement to Congress on Boulder Dam signified "unequivocal approval" of federal support for similar projects, Steiwer urged that the Secretary of War submit a favorable report so that power contracts for the future dams could be secured. Brown, already attempting to expedite the report's release, sent a careful but terse reply to Steiwer. "It is, in my humble opinion, the duty of Congress and the President to determine the policy as to federal participation in power works or any other kind of works." Stating that his duty was to "furnish a report showing the engineering and economic basis", Brown curtly outlined his professional views. "I like to furnish a clear cut recommendation also, which may be accepted or rejected without any elation or depression to me."¹⁰

3. A Plan For The Columbia

The two volume report comprised a thorough and accurate investigation of the Columbia River Basin. Although Army Engineer officials acknowledged that the Columbia River could be developed into the greatest water power system anywhere in the United States, the Division, Board of Engineers, and Chief of Engineers agreed that development should only be pursued deliberately when power markets would justify the expense of constructing major works.¹¹

The report reinforced changes in the way the Corps and the government viewed water resource developments since the early days of navigation projects. In analyzing potential uses of the Columbia River, Lukesh stated, "The power possibilities. . . may be considered the basis of this report [even though] the navigation possibilities sanction the report." The most important concerns now were the development of power, its transmission, utilization, and markets. Moreover, Lukesh dismissed the traditional justification for improving waterways as a means of forcing reduction in railroad rates as a cumbersome and uneconomic procedure. He saw little benefit in expending money to improve navigation. On the Columbia and Snake rivers above Portland, commercial navigation was almost nonexistent. Consequently, navigation improvements would benefit only a small, favored section of the public. Another factor which argued against expenditure of federal funds for the non-tidal section of the Columbia and Snake rivers was the impossibility of accurately determining prospective river traffic in this region. Above all, Lukesh considered the primary function of the Division report was to investigate economic feasibility of government projects; the engineering factors, although given due weight, would remain secondary until the project was economically justified.¹²

In addition to navigation, the report discussed other related uses of water resources: power, irrigation, and flood control. Flood control was the least important concern, generally thought to be a local matter concerning residents and governments of the two states. Moreover, Lukesh concluded that it would not be economically feasible to combine flood control with other designated uses in a federally financed project.

The irrigation section, of vital concern to Washington State developers, was less pessimistic, but it did find that federal expenditures for irrigation projects could not be justified if repayment were solely from sale of water to farmers. This was true for the Columbia Basin as well as for the middle and lower Columbia where the farmers would have to invest in

pumping plants and canals. When the agricultural economy improved, tracts below the mouth of the Snake River might be economically feasible for development. Lukesh thought that profits from power revenues could be used to subsidize large irrigation projects at The Dalles and Grand Coulee sites. Nonetheless, none of the several irrigation projects studied were deemed as economically justified under the present conditions. For the future, Colonel Lukesh recommended the pumping plan for the Columbia River Basin, as it would produce 400,000 kw of prime power, a resource that would be lost if the gravity plan of canals were adopted. The recommendation of the pumping plan cheered the supporters of the dam project, but linking construction to power markets did not.¹³

In analyzing the joint development of navigation and power, the report divided the Columbia into sections above and below tidewater. In the lower reaches, power dams were not feasible and irrigation was not needed, but because of the commercial importance of river traffic on this section, federal assistance for maintaining and improving the channel would continue to merit consideration by the Federal Government. On the non-tidal section of the river, the focus of House Document 103, the Division's report suggested eight power dams as the most feasible for ultimate utilization of the Columbia resources. These eight sites at Grand Coulee, Foster Creek, Chelan, Rocky Reach, Rock Island Rapids (under construction by a private utility company), and Priest Rapids in Washington, and The Dalles and the foot of the Cascades Rapids along the Oregon-Washington boundary would use 92.3 percent of the total existing head of the river between the Canadian boundary and tidewater. This was all the head that the Engineers believed could be developed economically. The series of dams and locks also would create slack water between each dam, with additional storage possible in lakes and tributary rivers, thus benefiting both irrigation and flood protection. Below the mouth of the Snake River, the locks should be installed when the dams were constructed; above this point, only when river traffic justified the expense. The report also recommended – again when justified by river commerce – the construction of additional navigation dams on the upper Columbia River between Pasco and Wenatchee. Because of the uncertainty of river commerce on the middle Columbia River, the Division recommended the government spend not more than \$5 million as a contribution from navigation benefits to offset the costs of constructing power facilities.¹⁴

From the list of eight dams, the Division selected three to be of special interest. The Dalles had notable power potential, and Grand Coulee was feasible for power production alone or for power and irrigation. The third, at the foot of the Cascades Rapids in the Columbia River gorge, was favorably located because of its proximity to power markets in the Portland area. This dam would also facilitate through navigation to the mouth of the Snake River. While declining to recommend which of the three should be built first, the report advised that the construction of each subsequent dam would wait the development of power markets.

The Board of Engineers, in reviewing the report, agreed with the Division that the Federal Government should pay for navigation locks on the middle Columbia and contribute as much as \$5 million toward dam construction. However, any construction should be contingent upon the development of markets for this power. Nor did the Board foresee a need to improve navigation on the upper Columbia. Although the Board generally agreed with the Division's plan for comprehensive development of the Columbia, it added two sites at

Umatilla and John Day, Oregon, to the Division's list of eight sites. The Board was unsure about the foundation for a dam at Warrendale, just below the Cascade Rapids, and the high dam at The Dalles. Noting that a dam at Warrendale would have to accommodate a possible flood of 1.4 million cubic feet per second and that the stream bed was sand and gravel, the Board stated that there was no precedent for such a structure. Similarly, the proposed high dam at The Dalles would involve methods of construction also without precedent. The Board recommended further engineering investigations at both sites. It also disagreed with the Division's figures of \$1 million in savings to be realized each year in transportation costs if navigation were improved. Using figures calculated for other waterways, the Board estimated that savings on the Columbia system would be only \$600,000.¹⁵

Regarding the middle Columbia, the Board sharply dissented with the view that the Federal Government should take a leading role in developing power and constructing transmission lines. The Board believed that private companies, states or municipalities should develop and distribute power. It further contended that on the upper Columbia the Division's estimates of future power markets were unduly optimistic and, more important, the effects of the current agricultural depression argued against expenditures for large irrigation projects. On this point, the Board agreed with the views of the Secretary of Agriculture, Arthur M. Hyde, whose statement was reprinted in the House Document. In this letter, Secretary Hyde expressed alarm at adding an additional 1.2 million acres to the nation's farmlands at a cost of over \$400 million. Hyde pessimistically observed, "The market is glutted with farmlands at depressed prices. There are no takers." In the future development of the Columbia River, however, the Board did recommend a large irrigation project (pumping) at Grand Coulee Dam and smaller ones elsewhere. The Board also expressed concern with passage of fish over the dams, pointing out that as yet no feasible plans had been developed for structures over 100 feet. It strongly advised further study of ways to protect the important salmon fishing industry.¹⁶

In the third and final review of the plan, the Chief accepted the Board's recommendations of ten sites for future dams but expressed his belief that the engineering difficulties at Warrendale and The Dalles, which worried the Board, could be surmounted. Nor was the Chief's office convinced that more detailed investigations were absolutely necessary. Perhaps the process of overseeing the 308 Reports had proven too exhausting. In any case the implications of the scheme were immense. "The cost of this development will exceed that of any kind for power that has ever been made," he stated. Estimates for the nine dams (Rock Island was presently under private construction) at 6 percent interest totaled \$772 million. Furthermore, these dams would compete with power from Grand Coulee which was expected to meet power needs for the next 30 years. The Chief of Engineers believed that the Division's report did demonstrate that power could be developed economically if done in increments that would not exceed the demands of the power markets. The best solution would be coordination by the region's power industry to avoid overproduction. To that end the Chief recommended that licenses for power dams conform with the general plan of navigation and power development proposed in the report.¹⁷

The Chief's letter also contained a statement from Elwood Mead, the Commissioner of the Bureau of Reclamation, who had been invited to add his comments. Mead agreed with the plans and costs for Grand Coulee and the recommendation

that power revenues must contribute to costs of irrigation development. He stated that the immediate inauguration of the project would not be contrary to this view. Allowing ten years to build the dam and power plant and another 10 to 15 years to absorb the power, Mead expected that increased population and new industries in the Pacific Northwest would provide clients for power and local markets for produce from the irrigated farmlands. The Bureau's Chief Engineer, W. F. Walter, expressed his optimism that the Columbia Basin project was physically and financially feasible. After completion of the power units, construction of irrigation works could proceed "at such time and in units of such size as economic conditions may justify." The postponement of irrigation, Walter asserted, would be economically detrimental.¹⁸

4. Authorizing and Beginning the Dams

Republican Senator Clarence Dill of eastern Washington, a staunch and tireless supporter of Grand Coulee Dam, recalled in his autobiography his unsuccessful attempt to persuade President Hoover to approve preliminary work. After leaving the President's office with his friend and fellow Washington Senator, Wesley Jones, Dill remarked, "We'll have no Grand Coulee dam while Hoover is in the White House. I'm going to find a Democrat who will build that dam and help nominate and elect a new president." Secretary of War Patrick J. Hurley shared President Hoover's conservative position on federal construction projects during a time of national depression and a mounting national debt. Hurley thought it ill-advised to introduce bills to finance construction projects on the Columbia in view of the national financial crisis. However, he was prepared to undertake the administration and coordination of power sales and navigation arising from any completed project, a function which Hoover had proposed for the Reclamation Bureau.¹⁹

The new President Dill helped to elect, Franklin Delano Roosevelt, proved instrumental in securing funds to begin both dams at the present Bonneville site and at Grand Coulee. Roosevelt departed radically from Hoover's conservative views on federal expenditures and indebtedness. This political philosophy that responded to the urgent need to alleviate the misery of the Depression and revive the economy, emerged during a campaign speech at Portland on September 21, 1932. Appearing before a massive and expectant crowd, Roosevelt promised to aid the Pacific Northwest: "We have, as all of you know, the vast possibilities of power development on the Columbia River. The next great hydroelectric development to be undertaken by the Federal Government must be that on the Columbia River." Immediately after the speech Roosevelt inspected what would be the future site of Bonneville Dam. Unfortunately, he failed to make clear exactly where on the Columbia River the next development would be, an omission that increased tensions between supporters of the Grand Coulee project and the group that favored a dam near Portland. Each faction interpreted the speech as support for its own dam.²⁰

The Grand Coulee alliance now favored a power irrigation dam instead of gravity-fed canals in the upper Columbia River Basin, but Oregon supporters of a dam on the lower stretches of the Columbia were divided. There was strong support for a site near Portland, but others lobbied for an Oregon dam located upstream at The Dalles or Umatilla Rapids where it

would benefit inland residents. Even those who wanted a middle Columbia dam were split between the two sites. Umatilla backers pointed out that The Dalles rapids already had navigational aids with the canal and locks, and that the bottleneck to shipping was at and above the Umatilla rapids. However, the mid-Columbia groups did unite in arguing that the lower Columbia had received adequate improvement with the Cascades project, and now Congress should aid inland shippers. Despite these arguments, they could not compete with the political clout of Portland.²⁰

Oregon Congressmen worked to convince Roosevelt to allocate funds for a dam near Portland and not at Grand Coulee where it would be of little benefit to Oregon. Representative Charles H. Martin from Portland, a member of the House Rivers and Harbors and Irrigation and Reclamation Committees, petitioned Roosevelt in June 1933. Referring to the recently released 308 Report, Martin recommended that the Corps of Engineers select the best site on the lower Columbia. Reminding Roosevelt of his authority under the National Recovery Act, as well as of his campaign speech at Portland, Martin described how the project could put thousands to work, stimulate shipment of materials and supplies, and provide cheap power. "Your immediate response," Martin concluded, "will be hailed with the most cordial gratification." Senator Charles McNary also helped persuade Roosevelt to authorize funds for Bonneville. According to Marshall Dana, editor of the *Portland Oregon Journal*, Senator McNary and Representative Charles Martin visited the President in May 1933, to discuss the proposed dam near Portland. In the spring of that year, McNary and Senator Frederick Steiwer introduced a bill to authorize the Warrendale Dam, subsequently named Bonneville. Then, in August 1933, McNary promised to intercede with the War Department in expediting Robins' report on the foundations for the dam which the Board of Engineers was reviewing.²²

The President's interest in providing jobs led to the release of funds for Bonneville and other projects throughout the country. In response to political pressure, General Brown instructed Colonel Robins that when money was allotted under the Recovery Act, Robins should initiate the most earnest efforts to expedite the work. Failure to promptly and vigorously prosecute the work, Brown warned, would invoke criticism and injure the Corps' reputation. "There must be no grounds for such criticism even in a single instance," Brown stressed. "I desire that the work of this organization be outstanding at this time in its energy and promptitude." Consequently, district engineers were instructed to make prompt decisions in awarding contracts and to allow only 24 hours for protests to be filed. Division engineers were empowered to give final approval for specifications and award the contracts instead of forwarding them to the Chief's Office for its decision. Brown also instructed division engineers to keep in close touch with operations. As a follow-up to preparations for hiring through the public works program, The Portland Chamber of Commerce gathered figures on the number of workers that could be immediately employed on the Bonneville project. These were based on the Division Engineer's estimate of funds available for various components of the project, i.e., roads and bridges, which could begin as soon as the government released funds.²³

Funding and authorization of the two dams was accomplished by various means. On June 16, 1933, Congress passed legislation authorizing a low dam at Grand Coulee. Because of pressure from mid-western states, Congress deleted

reference to reclamation, making the dam a power project only. Immediately afterward, Washington allocated \$337,000 to prepare plans and specifications as part of an agreement between Senator Dill and President Roosevelt that the state assist in the preliminary stages. Meanwhile, Oregon Congressmen McNary and Martin convinced Roosevelt to commit \$31 million to the Warrendale Dam, which he did on July 14. The *Oregonian* printed the story of the funds which a Spokane newspaper interpreted as a defeat for Grand Coulee. Dill rushed to Washington, D.C., and on July 27 he secured approval of \$63 million for his dam from the Federal Emergency Administration of Public Works. Now both dams were assured of funding from the Administration, and Roosevelt toured both sites on August 3 and 4, speaking to appreciative and enthusiastic crowds.²⁴

Questions remained about the final site for the Warrendale Dam and the height of Grand Coulee. On August 31, the Chief approved moving the damsite from Warrendale to Bonneville where a better foundation existed. Then, on September 30, the Public Works Administration approved Bonneville Dam under the National Industrial Recovery Act as Federal Project Number 28. The PWA allocated \$250,000 for surveys and \$20 million for construction in late September. Crews began exploratory drilling in October, and site work began on November 6. A few days earlier, on November 1, the Federal Government took over the Grand Coulee project from the state. Then, in April 1935, the Supreme Court challenged both projects, ruling that they had not been properly authorized. Congress amended this oversight in the River and Harbor Act of August 30, which authorized both dams, and it approved Secretary of Interior Harold Ickes' plan for a high, multiple purpose dam that would include irrigation with power. The first concrete for Grand Coulee was poured on December 6.²⁵

Because of the political and economic pressures to get Bonneville underway, the Division negotiated excavation and construction contracts even though plans for the structure were little more than pictorial sketches. Unemployment relief took precedence over engineering preparations. One controversial engineering feature was the size of the dam's locks. The Corps adopted a conservative posture in supporting smaller locks over larger ones that would accommodate sea-going vessels. The Chief's Office gave Oregon Senator Walter Pierce a cold, but respectful hearing, when he appeared in Washington to request that the Corps consider enlarging the locks. "They quickly informed me," Pierce reported to W. S. Nelson, the Secretary of the Inland Empire Maritime Conference, "that my task was entirely hopeless." Colonel Robins, who would be reassigned as North Pacific Division Engineer when it was reestablished at Portland in July 1934, also opposed the larger locks as well as construction of a deep ship channel up to The Dalles. He cautioned that the project should wait until the anticipated growth in shipping on the middle Columbia River justified the expense. The Division's opposition to these project modifications created a clamor from state politicians and chambers of commerce at Portland and The Dalles. In fact, tensions over the locks brought about the formation of a well-organized pressure group, the Inland Empire Waterways Association, which became an effective lobby for river development along the middle Columbia and lower Snake rivers.²⁶

In the rush to obtain approval of the larger locks for ocean vessels, Senator McNary and William Dodson, manager of the Portland Chamber of Commerce, worried that the

aggressive campaign by the new Waterways Association might interfere with construction at Bonneville. McNary, who "spared no efforts and left nothing undone" in Washington, D.C., found that General Edward M. Markham, the new Chief of Engineers, was "adamant in his opposition to the construction of the sea locks at this time," as were other members of the Administration, including President Roosevelt. As McNary persevered, the Board of Engineers discovered that it did indeed have sufficient funds for an economic survey that would include studying the advantages of deep sea shipping to The Dalles. A hearing on the matter was subsequently held at The Dalles on May 21, 1934. The hearing also became a forum for discussing the wider issue of navigation improvements in the inland Pacific Northwest.²⁷

The proposal for sea locks impressed President Roosevelt during his visit of August 3, to the construction site. There he stated that he hoped wisdom would prevail in enlarging the locks. Later that day, navigation interests met with Harold Ickes, Public Works Administrator and Secretary of the Interior, who accompanied Roosevelt. Soon after the President's survey, the Corps announced that expenditures for the larger locks were justified, a decision that observers construed as an important victory for the newly organized Inland Empire Waterways Association.²⁸

5. Fish Conservation and Passage

The planning and construction of Bonneville Dam raised the issue of conservation of anadromous fish runs, particularly salmon, which contributed substantially to the commercial and recreational wealth of the region. Anadromous refers to fish species that migrate from fresh water to the ocean and return when mature to breed in their native streams. Although the Division's modern role in investigating and designing methods of passing fish around dams and constructing hatcheries emerged after Bonneville Dam, the decades leading up to the construction of the dam involved the Division in many issues relating to this resource.

Despite the persistent belief that the Corps was not interested in fish conservation and was forced only by public opinion to include fish passages at Bonneville, evidence indicates otherwise. Engineer officers were acutely conscious of the important salmon industry and had been involved with fishery issues since the earliest period of Corps' activity in the Pacific Northwest. In those years of intense and unregulated fishing, fishermen introduced more effective devices to capture salmon - immense gill nets, purse seines drawn through the river by teams of horses, fish traps, and fish wheels. The fish wheel was especially destructive as large ones could harvest as many as 3,000 fish a day.²⁹

Although the regulation of fishing gear was primarily a state responsibility, the Portland Engineer Office supervised fishing equipment and boats in the interests of navigation. Both stationary gear and fishing boats often clogged the mouth of the Columbia and important shipping channels upriver. As early as 1887, the Senate requested an investigation into the intrusion of boats and nets into navigation channels. Major William Jones reported that interests of both navigation and commerce would be benefited by proper supervision and regulation by the government. He also remarked on the enormous reduction in fish as a result of the fishing industry and stream pollution. Jones recommended that the states



Fishing with nets at Rainier, Oregon on the lower Columbia.

build hatcheries and close the season for one week during the runs as a conservation method.³⁰

Under its federal authority for insuring the safety of navigation, the Corps' engineers found themselves embroiled in rivalries represented by the fish trappers employed by large canneries and the independent gillnetters who outnumbered the fish trappers. The Columbia River Fisherman's Protective Union organized the gillnetters and fiercely lobbied against the fish trappers. In the late 1890s, the Portland Office surveyed Baker Bay and ordered owners of obstructing traps to remove them under provisions of the 1890 Rivers and Harbors Act. This act prohibited the creation of obstructions in navigable waters. At the same time, competition between the fishermen became so intense that in 1896 the Governor of Oregon asked the War Department to loan the state a steamer to patrol the river, and the commanding officer at Fort Vancouver requested cannon and ammunition in case there was trouble.³¹

Except for ordering the removal of the most hazardous traps and issuing permits on an individual basis, the Chief's office prudently refused to sanction a blanket denial of permits for fish traps as the gillnetters had petitioned in 1901. "The differences and contentions between the two classes of fishermen," General Gillespie advised, "are not matters for adjustment by the War Department." He believed the solution would properly be found in local courts under local laws. Later in 1914, the Division, under Colonel Charles H. McKinstry, did take action to regulate fishing, but this time against gillnetters whose graceful, gull-winged boats were encroaching on navigation channels and areas designated for dredging. Under the authority of the Refuse Act of 1899, McKinstry issued a regulation in February 1914 that would ban gillnetters at specified sections of the river's mouth and channels. With this threatened reduction of their profits, the Oregon gillnetters petitioned McKinstry to reconsider the regulation, citing the ruin of the fishing industry and loss of income for several hundred men if the regulation were enforced. The petitioners also claimed that they had been forced to move their fishing operations to the mouth of the Columbia because the War

Department had issued permits for fish traps at places which interfered with their drifting nets. Although McKinstry offered to decrease the size of the restricted area, the gillnetters claimed that this action would be of little use because their nets drifted with the tides and could not be confined to a small portion of the river.³²

Despite these protests, McKinstry persisted and published a notice dated May 12, 1914, citing provisions of the 1899 Act and listing the same restrictions on gillnetters that he had announced in February. Fishing companies immediately protested, demanding that McKinstry explain his actions. When questioned by the Chief, McKinstry referred to a blueprint outlining the extensive area where netting was permissible and practical. He informed the Chief that despite the gillnetters' claims of financial ruin, he had been reliably informed that the year's catch equaled or exceeded the average annual catch. In refuting charges that unregulated fishing did not disturb river pilots, McKinstry stated that, so far as he could learn, navigation interests unanimously favored the regulation. He cited the example of one pilot who would not bring his ship in at night because the channel was full of nets. If the nets prevented large ships from using the channel at these times, McKinstry asked, what was the purpose of the \$10 million the United States had spent on improving the bar and channel? The Chief's Office immediately referred the matter to the War Department's legal office. After reviewing data on interstate commerce, navigation authority, expenditures, and the effect of nets on navigation, the Judge Advocate General decided that the rights of navigation were superior to those of fishing in terms of natural rights and conventional law. On a somewhat ominous note, the Judge stated that in his opinion fisheries could even be destroyed in the interests of navigation, citing legal precedents for this action. He maintained that Congress had superior rights over the public's right to fisheries under the 1899 statute.³³

In the issue of the rights of navigation versus those of fisheries, Congress had provided safeguards to protect fish from the adverse effects of dams. These provisions appeared

in an 1888 act which empowered the Secretary of War to provide "practical and sufficient fishways" in facilities that would obstruct fish passage. In 1906 Congress expanded and further defined this delegated responsibility by including fishways in a set of standards applicable to all dams on navigable waters.³⁴

These dual responsibilities for navigation and fishways surfaced dramatically in considering passage of anadromous fish – salmon and steelhead trout – over the proposed Bonneville Dam. During the comprehensive surveys of the late 1920s, Division Engineer Colonel Lukesh, anticipated the need to consider the effect of the proposed Columbia River dams on fish. "In connection with tentative design of dams for Columbia River and certain tributaries," he wrote in March 1929, "it appears that provision should be made for the passage upstream of fish, especially salmon, migrating to breeding places." Such provisions would affect both cost and available water for power generation. Facilities for migrating fish were not a totally new concern for the Division; the engineers had installed fish passages in the Willamette Falls locks near Oregon City and at the Ballard Locks in Seattle. In 1915 Division Engineer Colonel Charles L. Potter wrote to the U.S. Bureau of Fisheries about Oregon's plans for salmon passage at the Willamette Falls Locks. He stressed the need to balance navigation interests and costs with the most practical means of assisting fish through the locks with minimum losses. He concluded that a proposed second ladder would be unnecessarily expensive and inadvisable in the interests of navigation, particularly with the chronic shortage of water for both power and navigation. The better solution, Potter advised, would be to prevent the fish from entering a blind channel, where they had no chance of survival, and to divert them to the fish ladder already provided. The fish ladder for salmon at the Ballard Locks apparently caused little concern because of the modest height of the obstruction and the absence of power facilities, like penstocks and turbines, that cause mortality to downstream migrants.³⁵

Neither of these obstructions posed the threat to fish runs and the fishing industry that Bonneville Dam did. Around three-fourths of the anadromous fish of the North Pacific waters migrate from spawning areas in the upper tributary waters of the Columbia to the ocean where they spend three to six years. After this time, the mature fish return to their spawning grounds. In this arduous upstream journey, they rely on a homing instinct impregnated with the peculiar characteristics of their home waters. In fact, fish returning to their native streams to spawn will exhaust themselves and die in attempting to surmount a barrier to their home waters, instead of entering another similar, unblocked stream. The complete obstruction of the lower Columbia would have terminated all fish runs in the Columbia and its tributaries above Bonneville. The U.S. Commissioner of Fisheries noted that never before had a "structure of such size that obstructed migratory runs of such magnitude been built".³⁶

Although critics still contend that the Corps of Engineers ignored the implications of the Bonneville project for migratory fish, House Document 103 included design and cost estimates for fish passages at each of the proposed dams. A drawing of the first site at Warrendale clearly showed fishways on both the Oregon and Washington sides of the river. The Board of Engineers' report in that same document noted that more definite determination must be made for the passage of fish, and that no feasible passage plan had yet been developed for dams over 100 feet. While it is true the reports of the

Division Engineer and the Chief of Engineers contained no references to fish passage, it is hardly possible that a division engineer or his staff familiar with the commerce, recreation and political issues of the Pacific Northwest would have callously ignored or overlooked the problem. Already the Corps had been soundly criticized for issuing a license for a power dam at Priest Rapids without first insuring that the fish runs would be protected. At that time, ultimate responsibility for fishways lay with the U.S. Bureau of Fisheries and state agencies, not the Corps. In 1937, a conservationist charged that the Bureau of Fisheries failed to demand sufficient funds for migrating fish at Bonneville and did not fight hard enough to preserve the salmon in accordance with its responsibilities.³⁷

In 1933, one year before Bonneville was authorized, Portland District Engineer Major Oscar O. Kuentz urged in an article in *Military Engineer* that it was highly important to protect the \$10 million a year Columbia fishing industry which, he conceded, involved a problem of no mean proportions. He stressed that before beginning the construction of a dam, "studies must be made to determine the best method of passing the salmon over the high structure," or to find other means of continuing the fishing industry such as fish hatcheries. In the haste to authorize Bonneville and provide immediate unemployment relief, detailed plans for fish passages were not completed. That did not mean that the Corps ignored this item. The proposed budget for the dam included \$640,000 for fishways, although the actual costs later reached over \$7.5 million. Then, in fall 1933, the Bureau of Fisheries conferred with the Chief of Engineers and received assurances that the Army Engineers appreciated the importance of adequate fishways. The Corps advised the Bureau that a year would be available for the fish passage study. This would allow plans to be completed in time to include fishways in the dam. Although the Bureau of Fisheries requested special appropriations from Congress for the study, the Corps also contributed funds, first with direct payments and then by paying the salaries of the Bureau scientists.³⁸

Design of the Bonneville fish passage was therefore a collaborative effort partially sponsored and funded by the Corps. A team of experts including Harlan Holmes, an aquatic biologist from the Bureau of Fisheries, and Henry Blood and Milo Bell, hydraulic engineers, extensively studied the problem. An unofficial Interstate Fish Conservation Committee consisting of representatives from federal and state fishery agencies, the fishing industry, and members of the Corps' design staff supported their efforts. Enjoying entirely cordial and cooperative relations with the Corps, the team worked strenuously with models and tests, and it investigated fish passage facilities at other dams. The major considerations for this unique structure that would occupy two river channels separated by Bradford Island were these: the severe annual fluctuations in the river; the need for temporary fishways during the construction stage; and, most important, the safe passage of seaward fingerlings past turbines. The team also had to decide between fish ladders and fish elevators, each device having its advocates. The adoption of special low-speed Kaplan turbines and a bypass system satisfied the first concerns. Because of the lack of certainty about the success of the proposed fishway designs for Bonneville, the team decided to install both the ladders and the elevators. Later, the experimental elevators were discontinued. The crux of the design feature was the collection system which proved to be the key to upriver migration. The designers also included

facilities for generating three currents of water at each fishway to attract the fish to the ladders.³⁹

Concern over fish passage at Bonneville involved public groups, individuals and politicians. Senator McNary, whom many credit with securing funds for the immediate start on the Bonneville project, received numerous letters from the Oregon State Fish Commission and fish industry representatives about adequate protection of the fish runs. During the design stages of the fishways, the Division responded to public interest and anxiety with a public hearing in Portland in September 1934. The fishing industry also worried that the PWA would not release sufficient funds to build adequate fishways. The Astoria Chamber of Commerce, alarmed to learn that funds might be only \$2,500,000, warned Senator McNary, "The attitude of the PWA coming at this late date when the matter of size and type of fishways must be definitely decided within three weeks is exceedingly dangerous." The Oregon State Fish Commission asked McNary to intercede with the War Department. McNary conferred with General Markham and received assurances that the Corps was deeply interested in the protection of the fish industry and desirous of cooperating in every way possible. Although Secretary of Interior Harold Ickes had proposed \$3 million for passage devices, the Oregon and Washington fish commissions demanded at least \$3,660,000 for fishways and \$250,000 for the downstream bypass system. Further conversations between McNary and Markham resulted in provisions satisfactory to both states. John C. Veatch, chairman of the Oregon State Fish Commission, praised Colonel Robins and the Division personnel as being courteous and cooperative in every way possible, and he admitted to McNary that the work would have been a "great deal more difficult if the engineers had taken a different attitude toward our various requests."⁴⁰

The budget for the fishways was subsequently increased to \$3.6 million, but the final costs reached \$7 million by May 1938. The system of three fishways with collecting systems, fishladders and locks for upstream migrants, and the downstream bypass systems appeared to have solved the problem of passing fish around Bonneville. The Bureau of Fisheries optimistically announced in its 1937 report to Congress that, with a considerable margin of safety built into the fishways, every possibility of failure had been foreseen and provided for. A year after the project's completion, Harlan Holmes stated that the success of the fishways at Bonneville had been thoroughly demonstrated. From a modern perspective of declining or endangered fish runs, this optimism was premature. However, the experts at the time believed they had provided sufficient safeguards. At the least, they had addressed and explored the problem, and had set a useful example for cooperation and response to an environmental issue that would worry the Pacific Northwest and the Division in the years to come.⁴¹

In addition to apparently solving the problem of fish passage, the Bonneville Dam project was successful in other areas. As a public works project it created thousands of jobs for the unemployed, and in 1935 it was ranked third among PWA projects in numbers of people employed. Newspapers reported that Bonneville was a turning point in the Depression, pumping \$600,000 a month into the Portland trading area. Those who benefited included newly graduated engineers as well as unskilled laborers who earned 50 cents an hour. Still, the rush of laborers to the site where a new Bonneville District had been established to supervise the work, brought other problems which had been overlooked in the initial enthusiasm. The new construction communities around Bonneville Dam, like those at the Grand Coulee site, were filled with taverns and shoddy, unsanitary houses that rented at high prices. Along the Columbia Gorge, workers' shacks, squeezed in between the highway and the edge of the cliffs, overlooked the railroad tracks and the river. Although the Corps and the Bureau of Reclamation took care of their own employees and staff, most workers were left to the mercy of unscrupulous real estate companies and landlords.⁴²

Nevertheless, Bonneville was a symbol of future prosperity for the Pacific Northwest. The Portland Chapter of the American Society of Civil Engineers, among others, acclaimed the project as the most important economic development for the region, and counties bordering the Columbia formed port districts and constructed wharves and piers in anticipation of a vigorous revival in river traffic. On his second visit to Bonneville in the summer of 1934, President Roosevelt added another justification for the project: the potential of the Pacific Northwest to absorb a much larger population by offering a healthy environment and opportunities. The Oregon State Planning Board in 1938 optimistically predicted great social progress in the region because of the dam's ability to provide inexpensive domestic and industrial power.

In arguing for intense industrial development around the vicinity of the dam, the Oregon State Planning Board raised the issue of power distribution. Should Bonneville power be divided equitably among many clients, or should a large block be reserved for special clients located near Bonneville? Should power be sold at uniform rates to all residents and industries throughout the Pacific Northwest, or should industry and businesses closest to Bonneville enjoy the lowest rates? "Bonneville may become just another power plant," the Planning Board stated, "or it can become a master key, unlocking Oregon's storehouse of resources." This issue of a universal rate (postage stamp rate) versus a progressive rate dependent upon distance from the power plant (bus bar rate) became highly controversial. It involved the Division even more intimately in increasingly complex relations between federal and state agencies in the West.⁴³

CHAPTER 4. ENDNOTES

1. U.S. Congress, House Document 103, *Columbia River and Minor Tributaries*, 73rd Cong., 1st. sess., 1933.
2. *Seattle Daily Times*, 20 July 1930; *Seattle Post-Intelligencer*, 28 Oct. 1930.
3. Lukesh to Butler, 7 Oct. 1930, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 5; Washington Representative Sam Hill to Brown, 29 July 1931, and correspondence between Kuentz and Senator Wesley Jones, 6, 10 and 11 Aug. 1931, RG 77, NA, 111, 7249/175, 7249/149/1, /2 and /3; McNary to Loving, 29 Dec. 1931, and Brown to McNary, 31 Dec. 1931, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 7.
4. *Seattle Daily Times*, 20 July 1930; *Seattle Post-Intelligencer* and *Daily Times*, 27 Sept. 1931.
5. O'Sullivan to Butler, 29 Sept. 1931, and Sturdevant to Brown, 30 Sept. 1931, RG 77, NA, 111, 7249/175.
6. Gill to Joseph Swalwell, President of the Columbia Basin Irrigation League, 24 Sept. 1931, reprinted in Rufus Woods, *The Twenty-Three Year Battle for Grand Coulee Dam* (Wenatchee, Washington: *Wenatchee Daily World*, 1944), p. 27; Butler to Brown, 28 Oct. 1931, and Elwood Mead, to Brown, 3 Oct. 1931, RG 77, NA, 111, 7249/189 and /177.
7. The story is quoted in Gus Norwood, *Columbia River Power for the People: A History of Policies of the Bonneville Power Administration* (Portland: Bonneville Power Administration, 1981), p. 45. Norwood states that this decision hurt Butler's career. For information on Lukesh see Roy Scheufele, *The History of the North Pacific Division*, p. 7. Also, personal communication of author with Scheufele, 6 June, 1981. Butler to Brown 28 Oct. 1931, RG 77, NA, 111, 7249/189.
8. Notice, Board of Engineers for Rivers and Harbors, 19 Dec. 1931, *ibid*, 7249/198/1 and /2. The list of those receiving the notice included newspapers, chambers of commerce, mayors, governors and other state officials, development agencies, power companies, and the Denver headquarters of the Bureau of Reclamation.
9. Telegram, Coberth to Steiwer, 16 Jan. 1932, *ibid*, 7245/48 and 48/1. Brown's response to Steiwer reiterated the statement made to McNary of 31 Dec. 1931, RG 77, Seattle FARC, NPD 401, HD 308A and 308B, Vol. 7; Dodson to McNary, 1 Feb. 1932, and Brown to McNary, 23 Feb. 1932, RG 77, NA, 111, 7249/212.
10. Steiwer to Brown, 17 Feb. 1932, and Brown to Steiwer, 18 Feb. 1932, *ibid*, 7249/211.
11. House Document 103, p. 2.
12. *Ibid*, pp. 20, 21.
13. *Ibid*, pp. 79, 80, 84.
14. *Ibid*, pp. 55, 81. In 1930 a total of 5,136,847 tons moved between the mouth of the Columbia and the ports of Vancouver and Portland. The Division stated that this represented a steady increase from 3 million tons in 1920.
15. *Ibid*, pp. 6, 10-11.
16. *Ibid*, pp. 10-11, 13, 538-39.
17. *Ibid*, pp. 3, 5.
18. *Ibid*, pp. 5, 481.
19. Clarence C. Dill, *Where Water Falls* (Published by the author, 1970), p. 144; Hurley to Thomas, 7 May 1932, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 8.
20. Quoted in Fred Lockley and Marshall N. Dana, *More Power to You* (Portland: *The Oregon Journal*, 1934), pp. 66-67. Senator Dill attributed the incident to Roosevelt's mistake in omitting the proper reference to Grand Coulee in his speech which Dill had helped him prepare. Caught up in the excitement at Portland, he departed from his written speech and failed to make clear his intentions to support Grand Coulee and not Bonneville Dam as the next large project. See Dill, pp. 161-62.
21. Portland Section, American Society of Civil Engineers, *Review of the U.S. Engineer's Report on Columbia River* (Portland, 1932).
22. Martin to Roosevelt, 23 June 1933, RG 77, NA, 111, 7249/2581; Lockley and Dana, *More Power to You*, pp. 67, 105-106; Norwood, *Columbia River Power for the People*, pp. 35-36; McNary to his secretary, 16 Aug. 1933, Charles McNary Papers, Library of Congress, Washington, D.C., Legislative File, Box 33. Hereafter cited as McNary Papers. For more detail on the selection of Bonneville Dam see William Willingham, *Water Power in the Wilderness: The History of Bonneville Lock and Dam* (Portland: U. S. Army Corps of Engineers, Portland District, 1987), pp. 3-4.
23. Brown to Robins, 17 July 1933, RG 77, Seattle FARC, NPD 503, General, 1931-1940, Vol. 5; Dodson to Brown, 8 Sept. 1933, RG 77, NA, 111, 7249/296.

24. Norwood, *Columbia River Power for the People*, pp. 35–38.
25. Ibid.; Willingham, *Water Power*, pp. 4–7.
26. Harlan B. Holmes, “The Passage of Fish at Bonneville Dam,” *Stanford Ichthyological Bulletin*, 1:6, 1940, p. 182; Pierce to Nelson, 7 Jan. 1934, Walter M. Pierce Papers, University of Oregon Archives, “Columbia River, Umatilla Dam,” Ax 85, hereafter cited as Pierce Papers; Nelson to McNary, 30 March 1934, McNary Papers, Box 33; Willingham, *Water Power*, pp. 13–14.
27. A. J. Derby, Oregon State Hydroelectric Commission to McNary, 1 March 1934, McNary to Derby, 6 March 1934, and telegram, McNary to Nelson, 4 April 1934, all in McNary Papers, Box 33; “Minutes of Hearing before the Board of Engineers for Rivers and Harbors held at The Dalles on subject of a ship channel in the Columbia River from the mouth of Willamette River to Bonneville, Oregon, and ship locks in the Bonneville Dam, 31 May 1934,” copy in the Portland District library.
28. Gordon Lee Merritt, “Prelude to Slackwater” (unpublished Master’s Thesis, University of Idaho, 1973), pp. 68–69. Merritt’s work is the best source on the struggle in the 1930s and 1940s to obtain authorization for dams on the Columbia and Snake Rivers; Willingham, *Water Power*, p. 14.
29. For a description of fishing devices see Anthony Netboy, *Salmon of the Pacific Northwest* (Portland: Binford and Mort, 1958), pp. 20–28. Data on the yearly catch from 1866 to 1936 of salmon and steelhead trout is in U.S. Congress, Senate Document 87, Commissioner of Fisheries, “Report on Bonneville Dam and Protection of the Columbia River Fisheries,” 75th Cong., 1st sess., 19 July 1937, pp. 22–23. Hereafter cited as Senate Document 87; Willingham, *Army Engineers and the Development of Oregon*, p. 195.
30. U.S. Congress, Senate Executive Document 123, Major William A. Jones, *Report on the Salmon Fisheries of the Columbia River*, 50th Cong., 1st sess., 1888, pp. 16, 43; Chief of Engineers Brig. Gen. J. C. Duane to Sec. of War William C. Endicott, 21 Jan. 1885, RG 77, NA, 73, Letterbook 5, p. 234; Willingham, *Army Engineers and the Development of Oregon*, pp. 192–195.
31. Maj. J. C. Post, Portland Engineer Office to Chief of Engineers Brig. Gen. Thomas L. Casey, 15 Aug. 1894, *ibid.*, General Correspondence File, 2661/17; Act of 19 Sept. 1890, 26 Stat. 426, 454; Telegram of Oregon Governor to War Dept., 9 June 1896, RG77, NA, 103, 15569; Samuel G. Williams to Washington Rep. Wesley L. Jones, 19 March 1889, *ibid.* 24995/4.
32. Petitions of fishermen and letter of H. M. Lomtsen, Columbia River Fisherman’s Protective Union, 18 and 21 Feb. 1914, and Columbia River Packer’s Association to McKinstry, 19 Feb. 1914, *ibid.*, 91212. The Refuse Act is actually Section 13 of the Rivers and Harbors Act passed in 1899.
33. Memorandum, Judge Advocate General (illegible signature) to Sec. of War, 11 June 1914, *ibid.*, 91212/47.
34. Act of 11 Aug. 1888, Par. 11, 25 Stat. 400, 425 discussed in *Water Resources Law*, pp. 103, 327–28; Act of 21 June 1906, 34 Stat. 386, discussed in Frank N. Schubert, “From the Potomac to the Columbia: The Corps of Engineers and Anadromous Fisheries,” unpublished manuscript, Dec. 1978, p. 35, copy in the Historical Division, Office of the Chief of Engineers.
35. Potter to Chief, 29 Dec. 1915, RG 77, NA, 103, 99787.
36. Senate Document 87, pp. 14, 28.
37. House Document 103, pp. 1539, 1597, 1599, and 1602; Schubert, “From the Potomac to the Columbia,” pp. 42–43; editorial, “Conservation,” *Nature Magazine*, Jan. 1937.
38. Oscar O. Kuentz, “The Lower Columbia River Project,” *Military Engineer*, 25:139 (Jan.–Feb. 1933), p. 44; U.S. Army, Chief of Engineers, “Review of Report on the Columbia River, Washington and Oregon,” Senate Committee Print, 73rd Cong., 2nd sess. (Washington, D.C.: Government Printing Office, 1934), p. 16; Charles E. Jackson, Bureau of Fisheries to McNary, 9 Nov. 1933, McNary Papers, Box 33; Willingham, *Water Power*, p. 47.
39. Holmes, “The Passage of Fish at Bonneville Dam,” Oregon Fish Commission, *Contribution No. 2* (Salem: Oregon Fish Commission, 1940), pp. 182–86; Willingham, *Water Power*, pp. 47, 49–50.
40. The McNary papers contain letters from various people expressing concern over the provisions for fishways during the summer of 1933, see Box 33. Secretary of the Astoria Chamber of Commerce to McNary, 24 Nov. 1934; Veatch to McNary 21 Dec. 1934; Markham to McNary, 19 Feb. 1935; McNary to Ralph Cowgil, Oregon State Fish Commission, 27 Dec. 1934; and Veatch to McNary, 6 June 1935, all in McNary Papers, Box 33; Willingham, *Water Power*, pp. 47–48.
41. Senate Doc. 87, p. 43; Holmes, “The Passage of Fish,” p. 186.
42. Dawn Mueller, “Thousands Find Work at Bonneville,” and, “The Spirit of the Times,” *Corps’pondent*, 7:10 (June 1, 1983), pp. 3, 6–7; Charles McKinley, *Uncle Sam in the Pacific Northwest* (Berkeley: Univ. of Calif. Press, 1952), pp. 484–85.
43. Portland *Oregonian*, 1 Jan. 1934; Lewiston *Tribune*, 11 Sept. 1932; Lockley and Dana, *More Power to You*, pp. 78–92, 108–109; Oregon State Planning Board, *Oregon Looks Ahead*, Nov. 1938, pp. 69–70.

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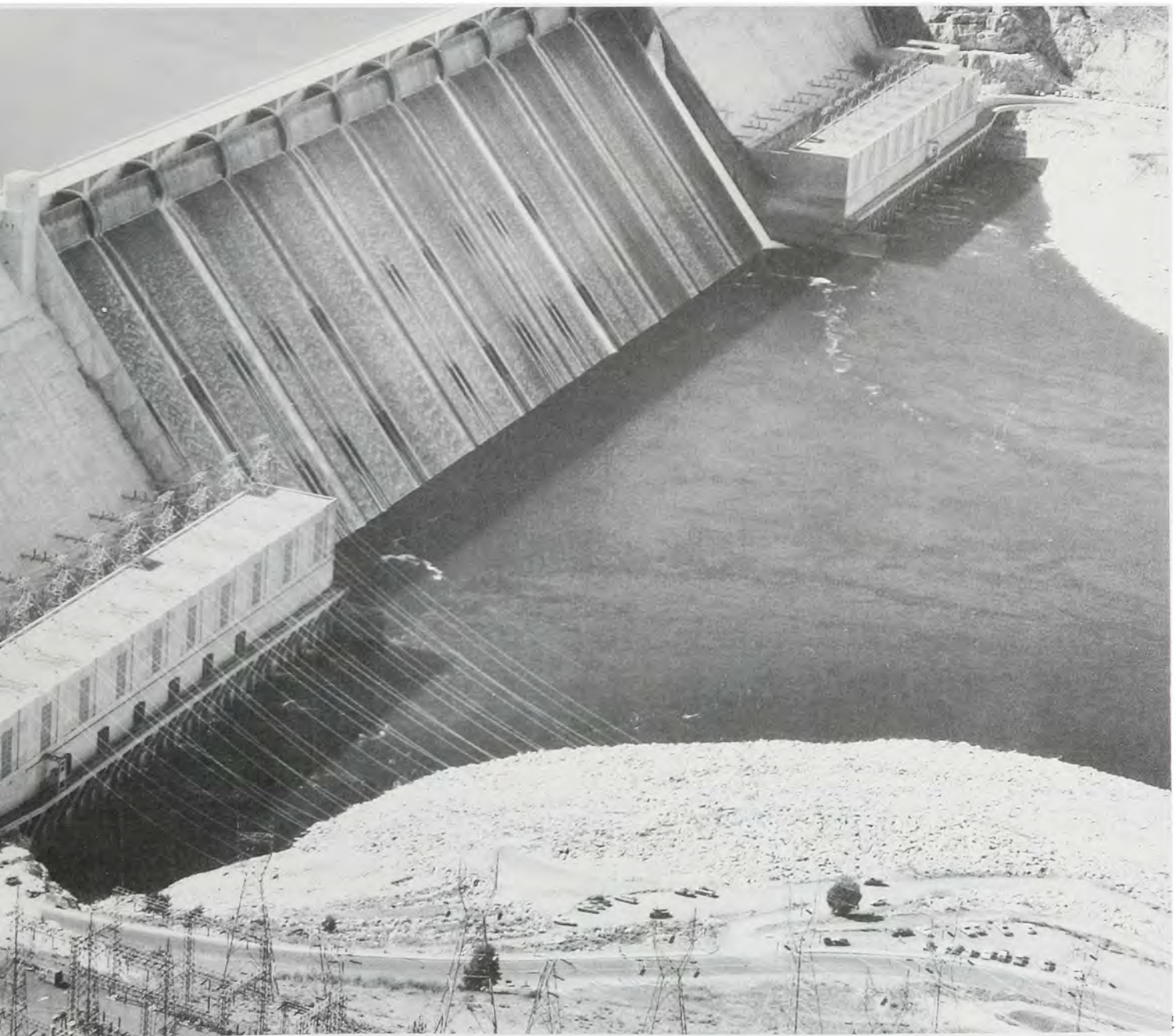
PLANNING FOR POWER:

**PACIFIC NORTHWEST REGIONAL PLANNING
COMMISSION AND BONNEVILLE ADMINISTRATION**



I want to thank you for coming in such numbers, for your attention and hard work and the study you have made of this great question of marketing power, and I hope that, while some of the statements that have been made sound a little pessimistic, we don't get the feeling that we are going to lay down on this job. The people of the Pacific Northwest never lay down and in spite of all the obstacles that seem to confront us, I think, if we all put our shoulders to the wheel, we are going to succeed.

Colonel Thomas M. Robins,
Address to the Pacific Northwest Regional Planning Commission,
1934 Conference



Grand Coulee Dam, 1968 third powerhouse construction.

1. Introduction

Construction of two federal dams on the Columbia and the understanding that subsequent ones would be built as needed and when justified set in motion a series of related economic and political issues. The anticipation of abundant, inexpensive power in a region with little industrial development prompted speculation about the great benefits this would bring. In the 1930s, this fertile area attracted impoverished migrants from the Dust Bowl, inspired in part by Franklin D. Roosevelt's speeches on the opportunities existing in this far corner of the country, "a wonderful land — a land of opportunity," capable of supporting a large population. During the depression of the 1930s, public confidence in private enterprise waned while faith in the government's ability to solve the economic crisis rose. Consequently, the Roosevelt administration took a more active role in planning and regulating the nation's affairs. In developing a program for national resources, Roosevelt created the National Planning Board. Although it was reorganized and renamed three times, it retained the same functions. One of the major activities was coordinating the work of regional and state resource planning agencies. In focusing on comprehensive planning of water resources, the National Planning Board coordinated the work of the President's Committee on Water Flow. Relying on the Corps 308 Reports and the Bureau of Reclamation's studies, this committee investigated ten major river basins and made recommendations for projects. Congress also contributed to water resources planning in 1935 by authorizing the Corps to update its 308 Reports with new data. This legislation extended the Corps' planning function for river basins at a time when the Administration was involved in similar activities.

In the Pacific Northwest, these planning efforts coincided with interest in industrializing and developing the region. Great resources of timber, minerals, water power, and anticipated population growth presented the national planning bodies with a unique opportunity to foster cooperation and rational development of the region. The Division's involvement in these planning bodies represented an integrated stage in what had been a less structured, irregular interaction, particularly with the Department of Interior during the planning of Grand Coulee Dam. Together with other federal and state agencies and the Pacific Northwest Regional Planning Commission (the regional branch of the National Resources Planning Board), the Corps helped in the lengthy collection and analysis of data, the investigation of the region's problems, and planning for its future development. The metamorphosis of the original Commission into the Columbia Basin Interagency Committee and then, again, into the Pacific Northwest River Basins Commission, reflected a complexity of issues and proposals that one agency alone could not resolve.

The pivotal issue in interagency cooperation centered on the marketing of hydroelectric power. In 1936 the Pacific Northwest Regional Planning Commission identified two alternatives. The construction agency responsible for building a dam could also be the marketing agent, which in the Pacific Northwest would be either the Corps or the Bureau, or a new agency could be formed for this purpose. Going one controversial step further, some people advocated a federal corporation like the Tennessee Valley Authority to regulate power from Pacific Northwest dams. Closely allied with this issue was the problem of a rate structure. Those who favored a bus bar rate believed that industries closest to the source of power should receive the lowest rates. This would clearly give

an advantage to Portland-based industries and encourage development around the Bonneville site. Those who advocated a uniform postage stamp rate (not dependent on distance from the source) wanted the benefits of cheap power extended over a large area, thereby bringing electricity to the more remote areas of the Pacific Northwest.

The Division, as represented by Colonel Robins, preferred to remain in charge of the distribution of power from its own dams. Robins also vigorously supported the bus-bar rate concept. The government resolved the two issues, contrary to the Division's position, by creating the Bonneville Power Administration under the Interior Department to distribute and market power and by establishing a postage stamp rate. Accepting this decision, the Division's record during the years before World War II and immediately after was one of cooperation with other federal and state agencies.

2. Pacific Northwest Regional Planning Commission

Regional interagency planning began on a national level under the National Industrial Recovery Act which authorized creation of the National Planning Board. This Board, which sought to prepare a comprehensive program of public works through regional surveys and plans, was succeeded in July 1934 by the National Resources Board. President Roosevelt gave this second board the additional duty of preparing a program and procedural plan dealing with the physical, social, governmental and economical aspects of the development of national resources. The Pacific Northwest Regional Planning Commission (PNRPC) was formed in January of the same year, and for the same basic purpose of providing federal relief from acute economic distress. The PNRPC also stimulated the formation of state planning boards. Marshall N. Dana was the chairman of the PNRPC and the Regional Advisor of the National Resources Board. Representatives from state planning boards of Washington, Oregon, Idaho and Montana served on the Planning Commission. In 1939 the National Resources Board became the National Resources Planning Board and a staff agency of the President. Chairman Dana was then the President's representative on planning matters in the Pacific Northwest.

The activities of the PNRPC moved well beyond public works into comprehensive interagency planning, particularly in water resources, land use and reclamation. Conferences and joint interagency studies formed the basis of the Commission's reports published in the mid and late 1930s. The reports brought into active cooperation the several federal agencies involved in water resources. Although the federal agencies were not members of the PNRPC itself, their field representatives provided staff and information for the technical committees. For example, Colonel Robins served as Chairman of the Subcommittee on Water Resources and Power in 1934. A member of the PNRPC later described the commission as standing at the apex of a loosely cohering federated planning structure for the Pacific Northwest. He saw its objectives as striving to bring about a more stable basis for employment, a more durable and prosperous agriculture, and a well-utilized resource base. The water and land committees functioned best and their federal agencies played the most active roles because of those agencies' regular, on-going activities in water and land programs. For its own part, the PNRPC contributed to interagency cooperation by providing a framework consider-

ably larger than each particular agency's responsibilities and specific viewpoint.¹

An expanded view and involvement in dialogue with other agencies was especially valuable for construction agencies like the Corps and the Bureau. Traditionally they had focused on the technical, engineering aspects of single projects rather than social and economic aspects of multiple purpose planning. For example, the first phase of Bonneville was not designed as a component of a larger power system, and Grand Coulee's outlet was not designed for effective flood control because of the Bureau's primary interest in irrigation. The involvement of these agencies in other concerns was a result of the PNRPC's response to the economic depression and to a new constituency of social planners, Native Americans, conservationists, and recreationists.²

The Division under Colonel Robins participated willingly and enthusiastically in the PNRPC, and the Corps hoped this commission would help expedite construction projects. In March 1934, Chief of Engineers General Markham praised the studies inaugurated at the first meeting. He also reminded Chairman Dana that the Corps was ready to begin all authorized river and harbor projects and had in readiness other well-advanced plans. He offered the services of Colonel Robins, in future conferences, as a representative of the War Department, and at the fall meeting of the PNRPC's Committee on Water Resources, Robins began his term as chairman by setting up subcommittees and scheduling reports. His committee contained forty members from four states.

Robins believed his committee should develop definite plans and projects. In the matter of power sales, he urged the power subcommittee to take some definite action, even offering to support research on power resources from Bonneville project funds. Above all, he wanted the Water Resources Committee to serve as a clearing house for the various agencies conducting power studies. He intended to make use of information and data from the Division's 308 Report in this endeavor. Although his long-range focus was on power, he acknowledged the importance of social issues. "Justification for work at this time on the Columbia Basin project," he publicly noted, "lies in the relief for unemployment and in the anticipation of future needs, and not on power sales."³

In the summer of 1936, the PNRPC turned its attention to a study of the Columbia River drainage basin, a study that was part of a national investigation on ten river basins. For this endeavor, Robins wanted federal agencies to be included in the PNRPC's conferences and to eliminate duplicate efforts by state planning boards. The Commission agreed and invited representatives of seven agencies: the Corps, Bureau of Reclamation, Geological Survey, Federal Power Commission, Soil Conservation Service, Forest Service, and Bureau of Fisheries.⁴

There were other instances where Robins demonstrated his predilection for efficiency and action. In 1936, after noting that regional planning agencies had been functioning smoothly and successfully for over four years, he suggested another procedural change. He believed it would be efficient to eliminate group meetings which split up the conference and squandered time and energy on technical discussions having no direct bearing on problems of planning. Instead of small meetings, he proposed general conferences at which summaries could be presented and discussion held on future planning. This would serve as a review for panelists. "Accordingly, in my

opinion," Robins advised, "the time is ripe for a review of the progress made to date and a clarification of the plans for the future, not only for the benefit of those intimately connected with planning but also for the public in general." Attentive to the need for a frank and open discussion, Robins hoped that discussion by the panel and from the floor would bring out differences of opinion, pertinent problems, possible solution, and viewpoints of the general public on the subjects presented. He also hoped the papers would be as few and brief as possible.⁵

An effective administrator, Robins earned the confidence of the PNRPC which appointed him Chairman of the Water Resources session for the following year's conference. He also served on the Program and Policies Committee. In giving him this latter assignment, Roy Bessey, a consultant with the PNRPC, asked Robins to consider carefully beforehand how to lighten the work at the conference and develop the most logical conclusions from the discussions. Bessey also invited him to make suggestions on procedure and action to PNRPC Chairman Dana. Through Robins' leadership, the Corps earned the Commission's respect as the most influential agency in regional planning in the Pacific Northwest.⁶

The Division also participated in another long-range planning activity in 1936 and 1937. The drainage basin studies were part of a national program reflecting the Administration's interest in resource planning through its national planning bodies. In carrying out the studies, the National Resources Committee set up sub-basin committees that included representatives of the Corps. The Committee recommended that federal agencies prepare and prioritize six-year programs as possible public works projects. However, the system of assigning priorities meant that the Chief's office had to avoid the appearance of favoritism and minimize pressure on, or from, field offices supporting particular projects. The Chief of Engineers directed his officers on the sub-basin committees to establish no priorities for the Corps' or other agencies' projects as the National Resources Committee had suggested. Further, Corps representatives were to refer all questions of policy and priority to Washington. These instructions meant that field officers were not to make any recommendations but were to respond to such requests with the statement, "The Engineer Department is prepared to cooperate with these agencies in rendering reports as to the engineering soundness of the projects. . . ." The Chief advised Corps committee members that they should not appear to sell their projects, but they should have factual information and attempt to obtain favorable reports on all projects authorized or favored by Congress. The PNRPC wanted the Division to make qualitative judgments about specific projects, and it objected to the Corps' refusal to set priorities. When requested by the PNRPC to use a rating system, Colonel John C. H. Lee, Robins' successor, objected. He contended that such a rating was improper because Congress had adopted all the projects the PNRPC wanted to be rated. He was also concerned that several projects had been excluded.⁷

Overlying this disagreement was the question of which branch of government would have the initiative in planning - Congress or the Executive Office. Many objected to the national planning board's interference in water resource planning. This objection contributed to the demise of the last planning body, the National Resources Planning Board, and the regional PNRPC in 1943. The failure to adopt the priority or rating system, reflected in part this conflict. Supporters of the Administration's planning efforts charged that the Corps'

refusal to prioritize projects hampered interagency planning efforts and weakened the basin committees. On the other hand, state and local interests supported the traditional system of Congressional authorization and funding of individual projects which they controlled to a large extent.⁸

The activities and investigations of the PNRPC did encroach upon two areas of interest to the Division and the Corps of Engineers. The first was control of the power-generating facilities and marketing of power from their dams. The second was a proposal, not original with the PNRPC or the NRC, to reorganize those departments involved in water resource planning. In the struggle over the marketing and control of hydroelectricity in the Pacific Northwest, the PNRPC advocated the creation of a new operating body, a Federal corporation that would assume all federal power operations. The crucial issue was one of authority, an ingredient missing in the national and regional planning commissions. As Gordon Fernald, the Division's representative explained to the Chief, the planning commissions desired to be placed in a more favorable position to propose and actuate regional planning. However, he believed they were isolated from the "true action branches of government," and any recommendations they made would be "ineffectual." The National Resources Planning Commission had proposed the establishment of regional coordinating boards, each consisting of five to nine departmental representatives and acting as a clearinghouse and coordinating agency. These representatives would investigate part of a large planning project pertinent to their own interests, harmonizing their studies with the schedule and overall view of the Planning Commission. While conceding that this arrangement would help avoid duplication and insure the coordination of all parts of a regional plan, Fernald pointed out that it would seriously handicap the War Department by transferring its authority to initiate plans to the Commission and the proposed coordinating board. Fernald also pointed out that the recommendation would have a more serious impact on agencies more centralized than the Corps.⁹

Although the planning functions remained unchanged, the NRC acquired the status of a statutory body in 1939. The Chief's Office accordingly directed Division Engineer Colonel Lee to be certain that a designated representative, and not a civilian assistant, attended the meetings. It hoped this would ensure the correct response to questions of policy.¹⁰

Although the regional planning bodies served an important function as a center and clearinghouse for information and ideas and assisted the planning efforts of many governmental agencies, Congress in 1943 refused to appropriate additional funds or to authorize a permanent planning branch in the Executive Office. Preoccupied with the war effort, the nation had little interest in pursuing domestic problems of resource planning and economic stability. Congress also was concerned that the President was usurping its functions. Although the national and regional planning committees under the executive branch disappeared, coordinated interagency planning continued with the Federal Inter-Agency River Basin Committee, formed in 1943 as a voluntary organization composed of the Departments of War, Interior and Agriculture and the Federal Power Commission. This federal committee created the regional component, the Columbia Basin Interagency Committee in 1946.¹¹

3. Marketing Hydroelectric Power

Two main issues emerged with the authorization and construction of the two Columbia River dams, Bonneville and Grand Coulee: first, how to determine and encourage markets for the hydropower; and second, the type of system and agency to be in charge of the distribution and sale of the power. Because the administration had gambled on the construction of these two giant hydroelectric projects, the successful sale of the power was necessary not only to justify Grand Coulee and Bonneville but also to ensure the construction of other dams planned for the Columbia River system. Oregon Senator Richard L. Neuberger, a New Deal partisan and promoter of producing cheap electricity for the Pacific Northwest, warned in the 1930s that "if the enormous blocs of power to be generated at Bonneville and Grand Coulee lie wasted and idle and are not put to economically efficient use, the rest of the energy in the continent's greatest treasure-trove of hydroelectricity probably will not be developed during the lifetime of any man now living." Even more was at stake in selling power. Neuberger as the champion of the small farmer considered the rate system to be the decisive factor in determining "whether the Columbia River Basin would be the world's greatest manufacturing region or an area of completely electrified farms and small towns."¹²

A survey of potential power markets became a part of the data collection for the first 308 Reports in the late 1920s and early 1930s. In preparing its plan for a series of seven dams, the Division acknowledged that the sale of power, not navigation, was necessary to economically justify the construction. An estimated 1,370,000 kilowatts of power would be available 90 percent of the time. Division Engineer Colonel Lukesh advised the Chief's Office that power market development would have to be stimulated to take advantage of this production. He was so convinced of the need for a comprehensive survey of major raw materials, production costs, and capacity and location of major markets, that he advised the Chief to establish a separate agency to undertake this assignment. Although the Chief's Office decided against the plan, the Division did undertake power market studies in 1930. It hired Professor E. A. Loew of the University of Washington to gather data from existing private power companies and regional industries and chart the historical trends in power usage. The results of those investigations comprised the major portion of the first volume of the 308 Report. In addition, Loew prepared a report on the cost of power transmission from the Columbia River plants to market centers. The Chief's Office considered information on power markets in the 308 Reports to be so important that it devised a system of indexing and summarizing power data.¹³

The important issue of power markets dominated discussions and debates on construction of additional dams on the Columbia River, particularly at Umatilla Rapids, and it influenced the work of the Division and Regional Planning Commissions over the next decades. Colonel Robins received some outside, unsolicited suggestions on the power studies. William Dodson, the head of the Portland Chamber of Commerce, suggested government financing of a pulp and paper industry which would consume substantial amounts of power. Impressed with the proposal as practical and well worth trying, Robins suggested that Dodson talk with the Chief

Transmission lines and towers from Lower Monumental Dam on the lower Snake River



of Engineers and request authority for the Division office to employ a paper mill expert as a consultant. After a discussion with Dodson, General Markham approved the request. The Division also requested authority to pay for the assistance of the Forest Service in its on-going investigation of potential markets for power from Bonneville Dam in the pulp and paper industry.¹⁴

The Division materially aided the work of the Pacific Northwest Regional Planning Board by contributing funds for a consultant from Washington State College who had worked with the board on the phosphate industry and aluminum clays. Under Robins' guidance, Raymond Miller investigated potential power markets. He reported in July 1936 that the demand for power from potential power-using industries would not exceed 200,000 kilowatts of primary and secondary power after Bonneville Dam was completed. The best prospects were for the development of large power consumption industries like aluminum, and encouragement of smaller users whose aggregate power consumption would be appreciable. Robins believed finding markets for Bonneville power was essential. Consequently, the Division investigated raw materials for industrial manufacturing and the economic possibilities for iron, steel, newsprint and aluminum production. He urged the Chief's Office to authorize the Division to undertake field investigations of mineral deposits to the limit of economical transportation. This exploration would afford prospective power buyers dependable information on primary electro-minerals. According to Robins, the key to bringing industry into the area would be attractive power rates. The Division also kept in close touch with other studies on home heating with electricity.¹⁵

Under Robins, the Division studied the transmission and distribution of power including the possible interconnections with other power systems. It made preliminary plans and estimates for transmission lines and substations for the interconnection and delivery of power at load centers. With Bonneville construction months ahead of schedule in spring of

1935, the Division undertook another study on rural electrification. By 1936 it was prepared to make final location surveys and construct lines and substations. The close collaboration between the Division and the PNRPC on power market surveys reflected the intense interests of resource planners and the Corps in this decade before World War II. In the 308 Report, the Division had linked the future of water resource projects to power markets. If Bonneville and Grand Coulee power could be sold, other dams recommended in that report might be authorized. The PNRPC was also interested in this possibility, and it recommended surveys of power markets from the two Columbia River dams and the Fort Peck Dam on the Missouri River in Montana. The Commission stated that the survey would contribute to the success of the projects and effect the complete and early integration of the projects into the Pacific Northwest region.¹⁶

The PNRPC went even further than this in anticipating how Bonneville power would be sold and distributed. The National Resources Committee authorized the regional committee to investigate the "immediate and urgent problems in the Columbia Basin as a prelude to establishing a power agency that would study alternative rate structures." At a December 1935 meeting of representatives from the National Resources Committee, the Federal Power Commission, the Bureau of Reclamation and the Division, Robins expressed the Corps' readiness to begin building trunk lines to interconnect with existing loads. He outlined a conservative plan for selling power based on the costs of transmission from the dam to the main substation. Employing the bus-bar or zone rate, this plan encountered stiff opposition from those who saw it as detrimental to the economic, aesthetic and social development of the Pacific Northwest.¹⁷

Robins based his argument for bus-bar rates on the fact that the Seattle area, with two new private power dams on the Skagit River, was over-installed and could not absorb additional power supplies; that transmission costs beyond a 100-mile radius (excluding Salem and Eugene, Oregon) would

not be competitive with costs of steam generating plants; and that there would be a substantial demand for Bonneville power from the Portland area. "The situation so far as Bonneville is concerned," Robins remarked, "is a local one." He further believed that Grand Coulee power could not compete with power from Bonneville and that large industries probably would not migrate to the area. Instead, there would be some electro-chemical and many small pioneer industries. The PNRPC did not agree with Robins' proposals and viewpoints. It firmly supported uniform power rates and a marketing agency.¹⁸

The question of which agency or type of agency would manage power marketing first emerged in the early 1930s. The issue proved to be one of the most controversial and bitter in the region, carrying with it larger economic and social implications. It also divided the region into factions, pitting the proponents of large-scale distribution of power such as Richard Neuberger, Marshall Dana and James D. Ross, head of the new Bonneville Power Administration, against groups like the Portland Chamber of Commerce that believed those nearest the generating and distribution points should have an economic advantage. Those who favored a TVA type of organization promoted a Columbia Valley Authority and supported the Bonneville Power Administration which had been created in 1937 as a temporary agency to market power. Those who opposed the CVA plan included Colonel Robins, Portland area commercial interests, and others genuinely frightened at the prospects of a socialistic type of institution. The battle continued well into the 1940s. Some of the rivalries were as old as the first attempts to improve navigation in rivers and harbors or to build railroad lines. In those early years, the improvement of transportation to one port threatened the business of a rival. Now, in the issue of power rates, the *Spokane Spokesman-Review* warned that if rates from Bonneville were to be 50 percent lower than those in Tacoma and Seattle, and even lower than those from Grand Coulee, Portland would be using government money to filch industries from the Puget Sound area. The solution was to operate the two projects together under a single coordinating board that would determine power rates "in the best interest of the region, as against the selfish, narrow designs of a single community."¹⁹

In addition, opponents viewed the bus-bar rate as a method of stifling the movement toward public power. Planners preferred a uniform, postage stamp rate that would prevent industrial congestion and centralization of industries. Uniform rates would bring benefits to a wider and more rural clientele, many of whom were without electricity. As early as 1933 Marshall Dana, then the Regional Advisor for the PWA, proposed a Columbia Valley Authority to the National Planning Commission. Under his plan, the CVA would market power from Bonneville and Grand Coulee. The Portland Chamber of Commerce protested that it had supported the Bonneville Project because of its location and ability to produce cheap electricity. Portland would lose this advantage if power from Bonneville and Grand Coulee power were tied into one system. The Federal Power Commission had estimated that Grand Coulee power would cost 1.76 mills per kilowatt hour as compared to Bonneville at 1.38 mill.²⁰

The President's Committee on Water Flow had already sanctioned the CVA plan. In 1934 it recommended the creation of a commission to work out a coordinated plan for the distribution of power from private, municipal, and government plants. The PNRPC also supported the concept of

a central agency to coordinate planning and operate large federal projects. It maintained that it was unreasonable for different agencies to operate plants on the same river or river system.²¹

Congress quickly responded to these marketing issues. In 1935 Idaho Senator James Pope and Washington Representative Knute Hill introduced legislation authorizing a Columbia Valley Authority. The Secretary of War immediately protested, arguing that the CVA's comprehensive powers would interfere with the Department's authority over navigation on the Columbia and its tributaries and with its plans for future projects. Then, Oregon Senator McNary proposed dividing responsibility for operating Bonneville Dam and marketing its power between the Corps and a Columbia River Administrator. The Chief's office again objected, adding that under such an arrangement the Corps could not guarantee the preservation of the important salmon fishery on the Columbia.²²

Others disagreed with the proposed legislation. The Portland Chamber of Commerce wanted the Corps to operate and market power and to guarantee low electrical rates for the area's paper mills. Under pressure from Portland, Senators Frederick Steiwer and McNary asked the Corps, the Bureau, and the Federal Power Commission to draft alternatives to a CVA. In July they and Washington Representative Martin Smith introduced bills giving the Corps authority to operate Bonneville, construct the main transmission lines, and market power with the FPC establishing rates. The proposed legislation polarized opinion between supporters of the CVA and those who wanted the Corps to market power using short trunk lines to Portland and Vancouver or directly from the dam.²³

A decisive factor in the controversy over rates proved to be a joint proposal of the national and regional planning commissions. The NRC and the PNRPC recommended a new federal agency to market power from Bonneville and distribute the power over a wide area, charging all users equal rates. In opposing the plan that the Corps and Bureau operate their own dams and distribute the power, the PNRPC concluded that the responsibilities of managing a supergrid power business would demand specialized engineering skill and business personnel which neither agency could satisfactorily fulfill. It believed these skills were absolutely necessary if all residents of the Pacific Northwest were to realize the greatest benefit from the power generated by the two dams. In comparing the two agencies, the Commission pointed out certain advantages of the Corps, such as its organizational flexibility and decentralized structure which made it "one of the best examples of good bureau organization for a regional enterprise." Moreover, Corps policy gave district and division engineers considerable freedom of judgment within their respective areas. In addition, relationships between district and division and between division and Washington, D.C., exhibited flexibility and permitted various levels of autonomy. In the North Pacific Division, the correlation of Divisional jurisdiction with geographical region allowed the Division to respond more quickly to the desires of the people than the Bureau could. The disadvantages were the Corps' inexperience in operating hydroelectric plants, the rotation of district and division engineers which disrupted the planning process, and the military structure of the Corps. The Commission contended that the military orientation was the greatest disadvantage because of its isolation from civilian society with its "different gamut of life experiences, its different problems of economic

maladjustment, and its peculiar aspirations for a more abundant civil life."²⁴

The Commission recommended creation of a special federal corporation with a board of directors (preferably selected from the NRC) and an advisory board. Agreeing with the PNRPC, the NRC recommended that a new operating body be established to undertake all federal power operations in the Pacific Northwest.

This body would also help insure lowest possible costs of electricity to the consumer. The PNRPC, with its roots in the philosophy of the New Deal, believed that the basic principle behind the "planning, construction and operation of the coordinated system should be maximum benefits to the people of the region and the nation . . . at the lowest possible rates consistent with sound financial considerations." Further, the new agency should use a blanket rate system like that now used by private utilities. Equal rates would help stabilize communities, decentralize new industries, increase employment, and promote domestic and rural consumption of electricity.²⁵

In March and April 1936, Oregon and Washington Congressmen, introduced legislation giving the Federal Power Commission authority to market Bonneville Power. In May the Senate held hearings at which representatives of the planning commissions, Portland's Dodson, and Colonel Robins testified. Speaking in favor of bus-bar rates, Robins described the economic problems that would arise from superimposing a huge transmission system over a region with a sparse population. He warned that high costs would prohibit industrial development and settlement. "You have got to have people to consume power," he stressed. "You can't sell power to jack rabbits . . ."²⁶

Congress ignored Robins' warning, and in 1937 it passed the Bonneville Power Act that created the Bonneville Power Administration as an agency of the Interior Department. The act also authorized the Corps to generate power at Bonneville. In allocating power supplies, the Bonneville Power Administration was to give preference to public and cooperative distribution systems. The legislation created an administrator to review and set rates that would be in accordance with the policy of the act and sufficient to reimburse the government for the costs of generating and transmitting power. The choice of public power advocate James D. Ross to be the first Administrator signaled the beginning of a regional power system with a specific social-economic framework. Although it was created to market power from Bonneville Dam, the BPA system was later extended to other federal projects in the region.²⁷

During the struggle over the rate structure for power from Bonneville Dam, the issue of the preservation of the Columbia River Gorge emerged. By insuring low rates at the source of power generation, the bus-bar rate promised to attract large industries to an area of unusual beauty and unspoiled scenery. Oregon Senator Richard Neuberger warned Pacific Northwest residents that a New Jersey chemical company, a Detroit aluminum and brass company, and a Pennsylvania sodium chlorate company, along with dozens of others, were eager to place their plants on the "fir-mantled ridges above Bonneville" once they were assured of bus-bar rates. The issues of aesthetics and preservation of scenic values came under the scrutiny of the PNRPC and involved the Division. The Commission's January 1937 report articulated many problems facing the Division in its engineering and construction work, such as the disposal of dredging spoils and the harmonizing of public works with the natural landscape. In its plea for good planning, the Commission contrasted the spacious and newly landscaped grounds of the Bonneville project with the tawdry scene of hastily constructed cheap lodgings, gas stations and amusement halls crowded onto a narrow strip of private land extending several miles along the river between the Bonneville property and the national forest.²⁸

Requested by the Chief's office to comment on this report, Colonel Robins expressed confidence that structural, architectural and landscape design on projects, including dredging and transmission lines which affected scenic and recreational values, could be harmonized and coordinated for conservation purposes. Robins reminded the Chief's Office this was a well-established policy. Because of undesirable and unsightly settlements that had sprung up in the vicinity, Robins urged immediate action to extend and consolidate public lands along the Gorge as the Commission recommended. He advised that additional costs, estimated at \$1.25 million, should be charged to recreation and not absorbed in the power rate structure. Whatever his differences of opinion with the PNRPC on rate structures, Robins worked with the planning commission to protect the Gorge. Later in 1938, Colonel Lee reiterated the Division's intentions of cooperating with the PNRPC on this matter. He assured the Commission of his concern and also pointed to the Bonneville landscaping as an example of the Division's commitment to protecting scenic and recreational values.²⁹

The issue of recreation reemerged with the construction of other dams on the Columbia and Snake rivers. In the arid country around the middle and lower Snake River dams, recreation became an important benefit to area residents. In the meantime, the adoption of the postage stamp rate helped deter industrialization along the lower Columbia.³⁰

CHAPTER 5. ENDNOTES

1. Roy F. Bessey, *Pacific Northwest Regional Planning: A Review* (Olympia, Washington, 1963), pp. 22–27; Charles McKinley, *Uncle Sam in the Pacific Northwest: Federal Management of National Resources in the Columbia River Valley* (Berkeley: University of California Press, 1952), pp. 461–62, 465. McKinley's book is the best overview of activities of federal agencies in the Pacific Northwest. He was a consultant with the PNRPC and a noted professor of political science at Reed College in Portland. See also, Richard Lowitt, *The New Deal and the West* (Bloomington: Indiana University Press, 1984).
2. Bessey, *Pacific Northwest Regional Planning*, p. 32.
3. Markham to Dana, 11 April 1934, Seattle FARC, NPD 507, PNRPC, Vol. 4; Minutes, First Meeting of Divisional Committee on Water Resources, PNRPC, Portland, 2 Oct. 1934, RG 77, Seattle FARC, NPD 5071/13, PNRPC, Vol. 4.
4. Robins to Dana, 7 July 1935, Bessey to Commission Members J. S. James, Will Simons, B. H. Kizer, and Ormond Bean, 8 July 1936, *ibid*, NPD 509/9.1, Drainage Basin Studies, 1934–1940, Vol. 5.
5. Robins to Bessey, 19 Sept. 1936, *ibid*, NPD 507, PNRPC, Vol. 3.
6. Will Simons, Idaho State Planning Board to Robins, 10 March 1937; Bessey to Robins, 25 March 1937, *ibid*.
7. Lee to Bessey, 4 April 1940, *ibid*, NPD 509/61.4, Drainage Basin Studies, 1934–1940, Vol. 1.
8. McKinley, *Uncle Sam in the Pacific Northwest*, pp. 464–65.
9. "Pacific Northwest Regional Planning Commission Report," in National Resources Committee, *Regional Planning, Part I: Pacific Northwest* (Washington, D.C.: U.S. Government Printing Office, 1936) p. 5; Memorandum, Fernald to Chief with report of PNRPC meeting of June 3, 16 June 1939; confidential letter of Barnes to Chief, 27 June 1939, RG 77, Seattle FARC, NPD 507/54., Vol. 3 and 2 respectively.
10. Lt. Col. Snow to Robins, 27 July 1939, *ibid*, NPD 509/60, Drainage Basin Studies, 1934–1940, Vol. 1.
11. Bessey, *Pacific Northwest Regional Planning*, p. 50.
12. Richard L. Neuberger, *Our Promised Land* (New York: The MacMillan Co., 1938), pp. 44, 65, 100.
13. Lukesh to Chief and Chief to Lukesh, 7 and 17 Dec. 1929, RG 77, NA, 111, 7249/71; Memorandum of Barry Dibble to Maj. Butler, Seattle District Engineer, 29 May 1930 and to Major Kuentz, Portland District Engineer, 9 Sept. 1930; circular letter, Col. Edgeston of Chief's Office to Division and District Engineers, 15 Sept. 1934, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vols. 3, 4 and 8.
14. Dodson to Robins, 14 Jan. 1935; Robins to Dodson, 23 Jan. 1935, Robins to Chief, 13 Aug. 1935, *ibid*, NPD 5132, Power Market Study, Pulp and Paper, 1934–1936, Vol. 1.
15. H. V. Carpenter, PNRPC consultant from Washington State College to Robins, 14 June 1935; Miller to Robins, 29 July 1935, *ibid*, NPD 513, Power Market Surveys, General, 1934–1939.
16. Martin to McNary, 30 April 1935; Robins to Chief, 6 July 1936, McNary papers, "Bonneville", Box 33; Report of the PNRPC, "Preliminary Plan for an Economic Survey for the Bonneville, Grand Coulee and Fort Peck Projects," n.d., RG 77, Seattle FARC, NPD 5071/8.4, PNRPC, 1934; Robins to W. L. Gosslin, Sec. to Oregon Gov., 17 Jan. 1937, *ibid*, NPD 513/12.5, Power Market Surveys, 1934–1939.
17. Harold Ickes to Roosevelt, 21 April 1936, in *Regional Planning; Part I: Pacific Northwest*, p. iii.
18. Minutes of Preliminary Conference, 18 Dec. 1935, RG 77, Seattle FARC, NPD 512, Power, General, 1935–1940, Vol. 2.
19. Dodson, Executive Vice-President of Portland Chamber of Commerce to McNary, 16 Dec. 1933, McNary Papers, "Bonneville," Box 33; *Spokesman-Review*, 27 Feb. 1936.
20. Norwood, *Columbia River Power for the People*, p. 80; Willingham, *Water Power*, pp. 41–42.
21. PNRPC, "Progress Report, Jan. 1934–1935," Portland, Oregon, copy in the Washington State University Library.
22. Secretary of War to Senator Smith, Chairman of the Committee of Agriculture and Forestry, ca. Jan. 1935, RG 77, NA, 111, 7429/321; Pillsbury to McNary, 11 June 1937, McNary papers, "Bonneville," Box 37.
23. Dodson to McNary, 7 May 1935, McNary papers, "Bonneville, Box 33, Norwood, *Columbia River Power for the People*, pp. 56–57.
24. "Pacific Northwest Regional Planning Commission Report", *Regional Planning, Part I: Pacific Northwest*, pp. 176, 184, 185.
25. *Ibid*, pp. 28, 40, 176, 185.

26. Norwood, *Columbia River Power for the People* pp. 59–60; quote in Norwood, p. 82.
27. U.S., *Statutes at Large*, V. 50, pt. 1, pp. 73–76; Willingham, *Water Power*, pp. 42–43.
28. PNRPC and the Columbia Gorge Committee, “Columbia Gorge Conservation and Development,” (Portland: Jan. 1937), pp. 42–43, 100.
29. Robins to Chief, 11 March 1937; Lee to Bessey, 3 Oct. 1938, RG 77, Seattle FARC, NPD 507, Pacific Northwest Regional Planning, Vol. 3.
30. The postage stamp rate was later fixed at \$17.50/kilowatt–year (kwy) for firm energy from the transmission system. Industries and others within fifteen miles of the power house could obtain a special “bus bar” rate of \$14.50/kilowatt–year (kwy) as long as they did not need more power than the plant could generate.

VI

THE INLAND NAVIGATION SYSTEM



But the indirect benefits from those savings in transportation costs are very great. You cannot state it in dollars and cents, but it means everything to the development of that whole country, to get this navigation now without waiting until you can sell all the power.

General Thomas Robins,
1939



The Dalles–Celilo drilling rock at John Day, steamer *Umatilla* in foreground, 1913

1. Introduction

To some, the start of construction of Bonneville and Grand Coulee culminated years of efforts to obtain hydroelectric power for the Portland area and reclaim arid lands in central Washington. To others, the approval for these two projects signaled the beginning of the development of a navigation and power system in the inland Pacific Northwest. The publication of the Corps' comprehensive plans for the Columbia River and its tributaries and the infusion of federal funds into the region encouraged businessmen, farmers and politicians to press for other dams and channel improvements. This did not mean that there was unified support for additional dams and river projects. Opponents charged that the two massive projects under construction would become white elephants, producing power for the jack rabbits in the Columbia Basin. Concern over the lack of power markets prevented the Corps and the majority of Congress from approving other construction projects on the Columbia or Snake rivers. The decisive factor that changed all this was World War II. The wartime aluminum industry which increased population and demand for more power convinced Congress that multiple purpose dams were essential for defense and industry. With support of the Bonneville Power Administration, the Corps urged construction of another federal dam in 1941 after a decade of warning against premature and excessive production of hydroelectric power. Not until 1945, however, did Congress authorize the third dam at Umatilla and the lower Snake River Project. This project would consist of dams and channel improvements for slack water navigation and for irrigation as outlined in the Corps Review Report of 1938.¹

The period between the beginning of Bonneville and Grand Coulee and the 1945 authorizations marked a significant development in the role of the Division and the Corps in the Pacific Northwest. The position of the Division as a major agency for water development in the region was reaffirmed by the review reports and appearances of Division Engineer Colonel Robins at several Congressional hearings. The consolidation of supporters and their lobbying efforts for development of the rivers directed at both the Corps and Congress raised charges of a pork barrel system. However, until 1941, the Corps played a decidedly conservative role despite pressure from commercial groups, state officials, and Congressional delegations.

2. Preliminary Investigations

Interest in an inland waterway was as old as steamer traffic on the Columbia and lower Snake rivers, dating back to the time of mining and pioneer settlement in the late 1860s. The completion of the canals and locks at the Cascades Rapids and between The Dalles and Celilo Falls constituted the first and temporary phase of slack water to Lewiston. The second phase would be the dams and the acknowledgment that navigation alone could not justify the projects. As early as 1913, the Reclamation Service and the State of Oregon had jointly investigated a proposed Celilo Dam, and in 1926 the renamed Bureau of Reclamation studied a dam at Umatilla Rapids. Both studies had been initiated by interest in the development of electro-metallurgical and electrochemical industries, and in the manufacture of fertilizers by an electrical process. Commercial groups such as the Umatilla Rapids Association, formed primarily of citizens of nearby Walla Walla under the leadership of Oregon Senator Frederick

Steiwer, lobbied strenuously for a dam at that location. Their main interest was creating a navigable slack water channel for agricultural products. The Bureau's proposal for a dam and power plant at Umatilla failed in the 1920s. Then the "308" investigations in the late 1920s and the availability of funds for unemployment relief invigorated supporters of the dams.²

Another well-organized pressure group, the Columbia Valley Association, coordinated activities of proponents of river development from the coastal areas east to Lewiston. In September 1930, the Association mailed a questionnaire to 77 commercial and farm organizations in Washington, Oregon and Idaho. The 53 respondents voted overwhelmingly for federal development for navigation, citing it as the most important benefit of multiple use projects. Colonel Lukesh's response to the inquiry was politely supportive. "I note that you are going to push navigation," Lukesh replied to R. H. Kipp, the Association's Executive Secretary, "and wish you success so far as navigation is reasonable and desirable." Kipp interpreted "desirable" as meaning approval of absolutely necessary channel improvements on the Columbia, Snake and Willamette rivers, a view from which Lukesh quickly dissociated himself. The term "desirable," Lukesh explained, was meant to be viewed in terms of cost. This exchange between Lukesh and Kipp which presaged an intense period of studies, hearings, and legislation (mostly unsuccessful) also represented the Division's position toward pressure groups. Although receptive to concerns and assistance of these organizations, particularly in collecting data on navigation, the Division took a cautious position.³ Lukesh's second reply to Kipp's offer to assist the Division in preparing the 308 Report clearly illustrates this stance:

The operations of your body are looked upon by this department as likely to be of distinct assistance to us in our work. Fact-finding is essential. What your body submits will, you are assured, be welcomed by us for earnest consideration. I cannot promise that we can go over the report, during its preparation, paragraph by paragraph — certainly we can't as to conclusions and recommendations, as that is expressly prohibited for the report is confidential till it reaches Congress . . . — but we will consider carefully all the data you submit and use what we can to reach impartial conclusions. . . Not unlikely, if your report is in the form we hope it will be, is convincing and is made up of sound data, it will be submitted with our report as an appendix as well as being referenced to in the text proper of the report.⁴

Marshall N. Dana, editor of the *Portland Oregon Journal* in the 1930s and an associate of Oregon congressmen, was a frequent correspondent with Colonel Lukesh. Anxiety preceding the publication of the first 308 Report and constant proddings and inquiries, including Dana's, brought an exasperated reply from Lukesh in January 1931, as to the attitude of the Corps toward the Umatilla project. "As you know," Lukesh wrote, "engineers are not materially different from other human beings. We cannot ordinarily give an answer to a given problem until we have obtained the facts on which to base our conclusions. This most important element, the obtaining of facts, is one which is generally laborious and time consuming." After crediting the Bureau of Reclamation's excellent work at the Umatilla site, Lukesh reiterated his earlier statement to Dana. The Corps would consider Umatilla Rapids as one of the prominent sites on the river, but it would not necessarily recommend it as the first to be built. Colonel Lukesh also reminded Dana that he should not insist upon

legislation for a dam specifically at the Umatilla site nor at the height proposed by the Bureau of Reclamation. Lukesh believed a more general bill would be preferable, although he made his own position clear on the matter of a Umatilla dam. It was a matter on which Lukesh was not free to advise, nor did he believe his advice would be of any value.⁶

The campaign for slack water in the 1930s began with intense efforts to persuade the Corps and Congress that channel improvement work on the three main rivers, Columbia, Willamette and Snake, was necessary to revive barge traffic year-round as a prelude to permanent canalization with a series of dams. In the spring of 1931, the Columbia Valley Association and the Portland Chamber of Commerce barraged Colonel Lukesh and the District with reports and data on the feasibility of barge traffic, particularly a tow barge operation to The Dalles. They bolstered their arguments with testimony from river pilots in an attempt to spark popular support for these navigation projects.⁸

Congressmen, particularly Oregon Senators Charles McNary and Frederick Steiwer who regularly sponsored legislation for river improvement, joined these local efforts. They were only partially pleased that the Division's final 308 Report on the Columbia River, as approved by the Board of Engineers and the Chief's Office, recommended \$16.1 million for a canalization project. This consisted of enlarging the channel and adding a series of locks between Vancouver and the mouth of the Snake to any dams approved by the Federal Power Commission. Although the report favored a series of dams for long-range development, the Corps would not recommend immediate construction of a federal project. Despite the Corps' conclusion that these dams were not justified, Senators McNary and Steiwer introduced a bill in 1932 to initiate the four-dam system on the Columbia at Warrendale, Celilo Falls, John Day, and Umatilla Rapids. At the Senate hearings held in Portland and Lewiston in September 1932, spokesmen for an open river, including governors, state and federal legislators and, of course, R. H. Kipp, were cheered by the gallery filled with farmers, river pilots and shippers, supporters of publically owned projects and "all classes touched by the mighty Columbia." There were 42 speakers before the Senate sub-committee, but only one, Colonel Thomas M. Robins, dissented from the recommendation to immediately construct the dams. Robins contended that the inactivity at The Dalles-Celilo Canal demonstrated the inadvisability of further investments until shipping improved on the middle Columbia below the mouth of the Snake River. Robins maintained that regional interests were mistaken in believing that improvements in navigation would increase river commerce. Like Colonel Lukesh, he proposed a phased development plan with each project awaiting authorization until it was economically justified. He did recommend \$400,000 to deepen the channel seven feet to Celilo.⁷

3. The Third Dam and Regional Disputes

The election of Franklin D. Roosevelt signaled the Pacific Northwest that the federal government would now carry out the promise of a dam on the Columbia River. While Oregon and Washington politicians during the first months of 1933 lobbied for the dam at Grand Coulee and on the lower Columbia River, a second contest developed over the placement of a dam along the middle Columbia River. To



Map of the Umatilla Rapids, 1878

those with interests in the interior, a dam at Warrendale or Bonneville was less important than one upstream. They pointed out that a dam at Bonneville would inundate the Cascades Locks just upriver. A further subdivision arose between those who preferred a dam at The Dalles and those who wanted one further upstream at Umatilla. The Columbia Valley Association, with its headquarters in Portland, was skeptical about the merits of the Umatilla Dam, especially if it were to be constructed first. According to Association President Clark Black, Umatilla could not be justified as an irrigation project because of the Depression; it had little hope as a power project because of the lack of powermarkets; and by itself it would be of little benefit to navigation. The Columbia Valley Association did not dispute the need to construct a dam at Umatilla, but it viewed development of the shallower Snake River channel as a greater aid to navigation.⁹

Those urging the development of rivers in a rural, under-populated region of the United States during a national depression based many of their arguments on the potential of river commerce. They emphasized a cause and effect between the high shipping rates of the railroads and economic stagnation of the region. While the Administration pondered the best site for the first Columbia River dam, these proponents of a comprehensive plan spoke of the element of vision needed to solve the Pacific Northwest's transportation problems and develop its natural resources. They hoped to persuade the Division, the Board of Engineers, the Chief's Office, the President and their own Congressmen of the

priority of a dam benefiting navigation in the interior. For the immediate future they advocated a channel five feet deep and 100 feet wide at low water, and the removal of some rapids to permit barges to carry freight upstream as far as Lewiston.⁹

These interests found little support for their plans in the Division's 308 Report on the Snake which was completed in March 1933. The Portland District Engineer had developed three improvement plans and costs for the lower Snake, from Asotin to the mouth: open river improvement at a cost of \$450,000; five low dams and locks to create a five-foot channel with the possibility of adding power in the future, \$14 million; or, six high dams and locks that would provide complete canalization and power development, \$56.6 million. Robins advised that the high dams and locks without power facilities, for the present time, constituted the best plan and that the plan for the low dams and locks had few advantages over traditional open-river improvements to justify the added costs.¹⁰

Although a system of high dams was the best engineering solution for developing the river's resources, Robins maintained that hydropower could not be justified. Power sites were too far from populated areas and industry, and there were few local markets to buy the power. His blunt statement was uncompromising in recommending against the dams for which inland producers and shippers agitated: "Improvement of the lower (Snake) River could advantageously be combined with development of water power, but such development is so far in the future that it is not a factor in the solution of current transportation problems." Robins also countered the arguments and data that claimed improvements would greatly increase river commerce. While it was theoretically possible that the total tonnage now moving by rail on the lower Snake could be transferred to river barges and steamers, Robins pointed out that, "Experience has shown that the tonnage that actually does move over an improved waterway is a small portion of the tonnage that might move at theoretical savings." Moreover, the estimated savings on this theoretical tonnage would fall far short of the annual interest on locks and dams. In addition, the alternative of open-river improvement would not lower rates sufficiently to attract commerce from areas not adjacent to the river. Notwithstanding his professional conclusions that improvements must wait, Colonel Robins was sympathetic toward developing the lower Snake River and retained a cordial, professional relationship with the river improvement groups.¹¹

Upon completion of the 308 Report on the Snake, Robins reviewed a brief filed by the Western Inland Waterways Corporation with the Board of Engineers. He regretted that his conclusions, particularly regarding partial canalization below Lewiston, would disappoint the Corporation. "I am disappointed about this, too . . . I think that you will have to depend upon open river improvement and the use of barges of not over 500 tons capacity, and I believe that something worthwhile can eventually be worked out along this line".¹²

Facing these setbacks, the river development groups still could not unite behind a single project. Portlanders agitated for a dam near their city while middle Columbia and Snake River interests promoted dams at The Dalles, John Day and Umatilla. The main division occurred between lower and middle Columbia supporters. During the summer of 1933 as Congressmen lobbied the administration for approval of Bonneville and Grand Coulee, E. B. Aldrich, editor of the *Pendleton East Oregonian* and a member of the Western Inland Waterways Corporation, did his own lobbying on behalf

of the Umatilla site. While Aldrich wrote to Roosevelt about the merits of a middle Columbia dam, Captain Ward of the Inland Waterways Corporation fumed that the Portland Chamber of Commerce and its protege, the Columbia Valley Association, had schemed for Bonneville despite their profession of neutrality. Ward suggested a public hearing before the Board of Engineers at which time the camouflage would be stripped from the proposed projects at Warrendale, The Dalles and John Day, and pertinent data on all four recommended dam sites would be laid before the Army Engineers. The Umatilla Rapids Association also requested a hearing from the Board of Engineers. It complained that not only were the Portland interests well-organized in their support of Warrendale, but the Division's investigation of that site at the request of Congress appeared to make that choice certain.¹³

The decision to build the dam at Bonneville and the commitment of funds in September was a general victory for proponents of river development but a disappointment to mid-Columbia and lower Snake River supporters. Their spirits sank even lower after learning of the reviews of the Board of Engineers and the Chief which accompanied Robins' March report to Congress. House Document 190, the official "308" for the Snake River, supported the conclusion of District and Division Engineers that development of the Snake was not presently feasible, that the present projects of Bonneville and Grand Coulee would provide sufficient power for years to come, and that navigation was the primary concern on the Snake. The Board approved District Engineer Major Oscar Kuentz's recommendation that until the middle-Columbia River was made navigable from the head of Celilo Falls to the mouth of the Snake River, only open river work currently authorized or recommended should be done on the lower Snake. By focusing attention on the middle Columbia River, this statement gave supporters some hope that another dam would soon be authorized and built at this bottleneck. They faced another formidable opponent, Interior Secretary and Public Works Director Harold Ickes who vigorously resisted requests from the Pacific Northwest for other Public Works Administration funds. Ickes called the House Committee on Rivers and Harbors a "bunch of crooks" and "pork barrelers" and asserted that the region had received more than its fair share of public funds for Bonneville and Grand Coulee.¹⁴

President Roosevelt's Committee on Water Flow assisted the inland waterway group's efforts in its report of April 1934. The report found that only the proposed Umatilla Dam could provide adequate channel depths, and it recommended improving river transportation to Lewiston by a deep-draft navigation channel to The Dalles and slack water behind Umatilla and other dams upriver. The project would include a total of six dams on the Snake from the mouth to Asotin, seven miles above Lewiston. The report noted that the country above Asotin in the rugged Snake River canyon in central Idaho possessed enormous resources of timber and water power and possibly great mineral wealth, but its greatest value lay in the opportunity for developing a recreational and wildlife area of such size as to be free of the hampering influences of private ownership.¹⁵

While Congress did not approve appropriations for a third dam on the middle Snake at that time, it did authorize channel improvements between the head of Celilo Canal and the mouth of the Snake in the 1935 Rivers and Harbors Act. This small victory was due partly to the indefatigable efforts of Oregon Congressmen Charles McNary, Frederick Steiwer, and

Walter Pierce, and partly to a new and well-organized pressure group, the Inland Empire Waterways Association. Formed in 1934 after meetings in Lewiston and Walla Walla, the Association represented the amalgamation of several groups including the Umatilla Rapids Association, the Tri-State League, and the Inland Empire Maritime Conference. The consolidation of separate groups provided economical and political strength, and its first act was a petition to President Roosevelt for funds for open channel work. The group also worked to secure larger locks at Bonneville, discussing the matter with Harold Ickes during Roosevelt's second visit to the site. Another victory for the organization was the appointment of its president, Herbert West, to the Water Resources Committee of the Pacific Northwest Regional Planning Commission. As the regional branch of the National Resources Planning Board, the PNRPC was entirely sympathetic to water resource development.¹⁸

In their cautious and conservative approach to river development, the Division and the Corps found themselves in opposition to the Administration's regional planning efforts through the PNRPC as well as to local politicians and river development organizations. Yet, the question basically was not one of opposing views, but of timing. Division Engineers Lukesh and Robins had expressed the Corps' commitment to the development of the Columbia River system when such projects could be economically justified. Although the initiation of Grand Coulee and Bonneville dams was a hopeful sign of the beginning of a comprehensive plan, the two dams also were viewed as entirely sufficient for purposes of irrigation, navigation and power for years to come. The Corps counseled against legislation authorizing additional construction projects during this period while Oregon Congressmen, primarily McNary and Steiwer, introduced bills for additional dams at each session of Congress. This generated a constant exchange of views. The open river supporters complained that their great handicap was the Army Engineers. The Corps' conservative stance also annoyed supporters of reclamation projects, like Marshall Dana, the President of the National Reclamation Association. He advised Colonel W. J. Barden of the Board of Engineers and former Division Engineer that he had "recently received numerous letters and comments suggesting a positively antagonistic attitude on your part in respect to the reclamation of land by irrigation."¹⁷

The Administration's reclamation policy emphasized national planning for the development of agriculture. The national depression created great urgency for these projects as President Roosevelt stressed in his messages to the 1934 meeting of the National Reclamation Association in Boise. "Reclamation as a federal policy has proven its worth and has a very definite place in our economic existence," Roosevelt wrote to the delegates. "The National Industrial Recovery Administration . . . is designed to pull us out of the depression . . . [and] I hope that the two [of you] may gradually but surely help the farmer to economic independence with the active cooperation of the administration." Nonetheless, Colonel Robins stubbornly maintained that reclamation in the Columbia River Basin must depend on the sale of surplus power. Speaking as chairman during a conference of the Pacific Northwest Regional Planning Conference in Seattle, December 1934, Robins asserted that the power expected from Bonneville, Grand Coulee and other projects would produce more than could be used in 15 or even 25 years. "Justification for work at this time on the Columbia Basin . . ." Robins continued, "lies in the relief for unemployment and in the

anticipation of future needs." Colonel Robins' statements convinced the Columbia Valley Association to appeal directly to the Board of Engineers. Realizing the futility of gaining approval for another dam, the Association based its request for a hearing on open-channel work. The hearing resulted in a \$40,000 appropriation which was included in the 1935 Rivers and Harbor Bill of August 30, 1935. The improvements were a seven-foot channel, "of suitable widths", from Celilo to Wallula.¹⁹

The Senate also had requested the Board of Engineers to review the two 308 Reports on the Columbia and Snake rivers, House Documents 103 and 190, respectively. The Board proposed 10 dams and locks from the mouth of the Snake to Lewiston, but it recommended against construction until additional locks and dams were built on the middle Columbia River, power markets were developed, sufficient experience was gained in passage of migratory fish, and the value of the new navigation facilities demonstrated. Continued pressure from the Pacific Northwest resulted in another comprehensive "308" review of the Columbia and Snake River reports, published in 1938 as House Document 704.¹⁹

Colonel Robins' report completed in June 1937 presented a detailed analysis for the middle Columbia and lower Snake rivers based on topographic, aerial and hydrographic surveys, and new data. Since the time of his appointment as Division Engineer in 1931 for the consolidated Pacific Division, Robins had become well acquainted with the region and its transportation needs. From his San Francisco Office he maintained a correspondence with the river development interests and attended hearings including one held in May 1934 at The Dalles before the Board of Engineers convened by Portland District Engineer Major Charles F. Williams. Robins participated in a lively discussion on navigation and rates, transportation patterns and carriers, and marketing and shipping problems along the rivers. Through his influence, the Chief recommended a 27-foot deep ship channel from Vancouver, the head of deep water navigation, to Bonneville. Shortly after the 1934 hearings, the Corps reestablished the North Pacific Division with headquarters in Portland.²⁰

Robins' 1937 report demonstrated his commitment to full federal development of the river, primarily for navigation, although he maintained such development was still in the future. He insisted that further improvements of the middle Columbia and lower Snake rivers be considered as a single project and that the proposed waterway route from tidewater to Lewiston could not be accomplished through open river improvements. He proposed four, instead of three, dams on the Columbia and recommended that these be equipped with facilities for future power installations. He also recommended four dams and locks be constructed on the lower Snake along with continued open channel work. Power installations at these lower dams might be feasible but expensive. In the interest of future navigation Robins advised Congress to consider authorizing a ship channel instead of a barge channel above The Dalles.²¹

The Division's report also considered plans for a high dam (680 feet) at The Dalles to replace a series of smaller ones. After a thorough study, Robins advised against such a structure. He believed the high dam would be considerably more expensive in terms of operating and power costs than a series of small ones with headwater storage. In addition, the 50-foot draw-down created by a large dam would increase the costs of terminal facilities, create a marshy, unsanitary area, necessitate relocation of miles of highways and railroads, and

flood arable farmland. It also would threaten migrating fish. Noting that facilities for navigation and fish at a dam of that height were unprecedented, he warned, "The Dalles high dam would be an insurmountable object to the migration of fish and would destroy upstream salmon fishing." He reminded Congress that the preservation of all commercial and sport salmon fishing depended on adequate facilities for passing fish over the proposed dams. Furthermore, he foresaw practical difficulties in obtaining a large sum for a single, mammoth project whereas smaller projects could be built in increments as the market for power increased.²²

The Division's report represented a significant step toward the creation of slack water for through commercial navigation between tidewater and the interior of the Pacific Northwest. Although Colonel Robins maintained that the direct benefits would not be commensurate with the cost, his report did bring some measure of satisfaction to supporters of slack water to Lewiston. He named through navigation to Snake River points as the most pressing need of waterborne commerce. He advised that the Umatilla Dam and four dams on the Snake should be built before any other projects were constructed below Umatilla. While leaving the decision to begin immediate construction to Congress, Robins enthusiastically praised the plan. "Provision of low-cost water transportation between tidewater and the interior will promote the economic security and future development of agriculture and industry in the Pacific Northwest," Robins concluded, "and is more or less essential to the success of the Federal projects already undertaken . . . The indirect benefits to be expected from the improvements proposed . . . are, therefore, very material and may well be sufficient to warrant starting construction work at this time without waiting for further development of the power market."²³

In reviewing Robins' report, the Board of Engineers and the Chief disagreed about when to initiate the projects. The Board, persuaded by Robins' report and testimony at the hearings, recommended the near future even though tangible benefits would not justify the cost. Its primary concern was stimulating development of the Pacific Northwest's natural resources. Chief of Engineers Major General Julian L. Schley expressed his belief that this very promising section of the country would eventually justify the projects. Nonetheless, he declared himself unable to recommend immediate adoption because there were no markets for additional power. Instead he advised accepting the general plans as a guide for future development and authorize portions of it when warranted. In addition, Schley urged Congress to take some action to give the project a stamp of approval. This approval would furnish a basis for modifying existing work and provide an overall plan for public relief or local and state efforts.²⁴

Unable to wait for the release of the final Senate document, Senators McNary, Steiwer and Pope in March 1937 introduced a bill authorizing improvement of the two rivers. The Secretary of War declared this action premature and a departure from the judicious policy of first considering costs and benefits. In the meantime, water development groups waited impatiently for the Board of Engineers and the Chief to complete their reviews. The Inland Empire Waterways Association asked Washington Representative Knute Hill to intercede for them in Congress, quoting Robins on the importance of cheap water transportation for the economic security and development of the Pacific Northwest and the success of projects already underway. Navigation supporters also argued that the dams would create employment and

requested that the new Division Engineer, Colonel John C. H. Lee, give them estimates on the number of men who would be employed on the Umatilla and Snake projects. Although the Division kept its report confidential while the Board of Engineers and Chief prepared their reviews, groups like the Columbia Valley Association were able to take copious notes and pass them along to their Congressmen.²⁵

Officially, the Corps did not promote its own recommendations. As Colonel Robins explained in his 1937 report, the Corps' designated role was to analyze and present the data and information. It was up to Congress, in its wisdom, to make the final decisions. However, the Corps wielded considerable influence because its reports were generally accepted as being thorough and accurate. Organizations like the Inland Empire Waterways Association acknowledged that the new review of the Columbia and Snake would influence Congress. In 1936 this group had accepted Robins' recommendation to change its strategy and work on a complete program for slack water from The Dalles to Lewiston instead of trying to gain authorization for one specific project. A resolution to this effect worried Representative Walter Pierce. He questioned the wisdom of the Waterways Association explicitly following the advice of the Army Engineers, particularly if they recommended a high dam at The Dalles.²⁶

Cooperative relations and the influence of Congressmen and local interest groups also helped the Corps retain its civil works functions. In 1932 Congress had approved a transfer of civil works and Hoover ordered these duties be given to a new Division of Public Works within the Interior Department. Responding to numerous protests, the new Congress repealed the order in March 1933. When the issue reappeared in 1937, The Dalles Chamber of Commerce and Port Commission immediately complained about the contemplated transfer. These two groups telegraphed their protests to Senator Pierce, commending the Army Engineers as highly efficient and eminently fair in considering all proposals. Pierce was less sanguine, noting the Corps' opposition to establishing a Port Commission at The Dalles. While admitting his great confidence in the Corps' ability and its important future projects, Pierce stated he would have preferred more cooperation with other governmental bodies in the struggle for river development. Although Pierce's remarks demonstrated that the Corps could not completely satisfy everyone, enough pressure was applied on Congress to persuade it to abandon the reorganization plan.²⁷

Pierce's complaint reflected his dissatisfaction over the slow pace of river development and not with the Corps' activities as a water resource agency. To many residents of the Pacific Northwest, the Corps appeared to block plans for rapid development of water resources. In contrast to the Corps' position, President Roosevelt and James D. Ross, the Administrator of the Bonneville Power Administration, were forthright advocates of generous government development of public power. In 1938 Ross expressed his firm belief in the future of hydroelectric power in the Pacific Northwest. He agreed with the Division that the recommended lower dams would produce more power at a lower cost than the one large dam at The Dalles. Ross also agreed that it would be more economical to build the dams in sequence. However, he maintained that the time would soon arrive, if indeed it had not already, when the sale of power from hydroelectric projects would subsidize navigation and flood control projects. Firmly believing in Bonneville as the forerunner of other regional hydroelectric projects, Ross disparaged the tremendous

propaganda manufactured by the crepe hangers that Bonneville and Grand Coulee would become white elephants. Declaring himself unequivocally in favor of early construction of Umatilla Dam, he advised Roosevelt, "Whatever portion you feel the power should pay for we will gladly get to work to return the money to the project by building a market . . . No great hydropower plant ever goes begging these days. The sooner the next Columbia plant is built the better." Ross's conclusions amply supported Roosevelt's philosophy, and Roosevelt requested the Secretary of War and the Chief of Engineers to read the report and then consult with Ross and the National Resources Committee. Roosevelt hoped this would keep all agencies of the Government working together.²⁸

While the Bonneville Power Administrator expressed optimism over finding markets for hydropower and the Corps maintained its cautious approach, long-time supporters of the inland waterway found little comfort in either agency. The publication of House Document 704 in the summer of 1938 further discouraged those who wanted immediate construction. However, the document did contain a two-year plan for Umatilla and estimates for four dams and open channel work on the Snake River. The Chief's office gave the Umatilla boosters hope by recommending to the Bureau of the Budget that "it would appear to be preferable to undertake at this time the construction of the Umatilla Dam and Lock and to defer work on the remaining dams proposed rather than undertaking all the work simultaneously."²⁹

During that summer, the Inland Empire Waterways Association and Northwest Congressmen also attempted unsuccessfully to obtain public relief funds for Umatilla Dam. They submitted an application for \$24 million through the Chief's Office to Harold Ickes, the Administrator of the Public Works Administration. Bonneville District Engineer Major Theron D. Weaver supported the request by stressing how the dam would make open channel work unnecessary and employ from two to three thousand workers. The summer and succeeding months passed without an appropriation despite legislation introduced in Congress by Senator McNary and Representative Compton I. White of Idaho, and national radio broadcasts by Representatives Nan Wood Honeyman of Oregon and Knute Hill of Washington. Although the Corps contended that the projects must wait, the supporters perceived that the key to authorization and appropriations lay with the Corps, believing that agency had the ability to persuade and influence Congress to pass the necessary legislation. "The public of this Inland Empire has acquired great confidence in the work of the Army Engineers," wrote one supporter from Hermiston, Oregon, to the Chief of Engineers. "The people believe that the Army Engineers are strongly for this construction." Another supporter argued that Umatilla would justify the construction of the other two dams by creating the inland waterway and cheap transportation for the agricultural products from the thousands of new settlers in the Columbia Basin.³⁰

On April 17, 1939, the House Committee on Rivers and Harbors held a hearing on the proposed Umatilla Dam, collecting statements from the Northwest Congressmen, river associations, and Colonel Robins, who appeared as the official representative of the Chief of Engineer's Office. The hearings revealed the perseverance of the region's politicians and the Corps' precarious balance of supporting navigation improvement while maintaining a cautious approach to hydropower development. Speaking as past Division Engineer and member of the Board of Engineers, Colonel Robins reiterated his

position toward the future water resource needs of the Pacific Northwest. In his introductory statement, Robins characterized the 250,000 square mile watershed as "very rich in agriculture, mineral and forest products, but only partially developed and sadly in need of cheap transportation, irrigation and hydropower." Robins severely criticized the less expensive method of securing a five-foot depth for commercial navigation by means of open river work. This depth would be impossible to obtain, he remarked to the committee, because of the swift currents and narrow and tortuous channels. "It just will not pay," Robins emphasized, "and you cannot get anywhere with it." He contended that locks and dams were necessary to supplement open river work and make commercial navigation feasible. Robins also based his argument on the region's geography. The best way of serving the inland area within the Columbia Basin irrigation project was through transportation on the Snake River and not along the upper Columbia River because of the deep canyons there. Robins accordingly advised that the middle Columbia and lower Snake rivers should be treated as one project as far as navigation was concerned. He recommended "such improvements as would secure, as soon as possible, through commercial navigation from Lewiston down the Snake and down the Columbia."³¹

Representative Pierce agreed with Robins on the importance of river navigation to the Columbia Basin irrigation project. Citing a recent report of a Congressional commission, Pierce pointed out that the study showed that failure of irrigation projects "to make complete financial success" was due to excessively high freight rates. Noting the \$100 million already expended on Grand Coulee, Pierce described how Umatilla Dam would provide slack water navigation on the "very edge of this future irrigated empire" and for other irrigated lands to be developed. The opening of these lands to settlement, Pierce continued, would provide homesteads for the "landless millions in the cities, thousands of whom had already come to the Pacific Northwest searching for homes and a few acres to farm."³²

Restating his position in House Document 704, Colonel Robins stressed the importance of indirect benefits resulting from Umatilla Dam, benefits which could not be used in calculating the direct economic benefits. Although he admitted navigation improvements would not be economically feasible without power, he urged the committee to consider the indirect benefits. "You cannot state it in dollars and cents, but it means everything to the development of that whole country, to get this navigation now without waiting until you can sell all the power." The responsibility for undertaking the project, Robins insisted, lay with Congress. The Corps could only report on the direct benefits.³³

As the committee pressed him for a definite statement on the project - taking into account both direct and indirect benefits - Robins refused to go beyond the Corps' official position. He argued that the navigational features of Umatilla and the other proposed dams were not economically justified at the present time, that markets did not exist yet for additional power projects, and that Congress in its wisdom must decide if and when to undertake construction. This latter step, Robins maintained, was necessary as the only present justifications were the indirect benefits accruing to the people of the region. This exchange between Robins and the committee members revealed the Corps' strong support for development of water resources in the Pacific Northwest and the skepticism of some Congressmen toward an \$80 million plan that might remain useless for 30 or 50 years. As

Representative Harry W. Griswold of Wisconsin grumbled, building Umatilla Dam would mean spending \$30 million to make a 30-mile, nine-foot channel from Umatilla Rapids to Pasco.³⁴

The hearings highlighted two changes in water development projects in the Pacific Northwest. First, the Federal Government now was involved in the power business; second, hydropower would sustain navigation, instead of the other way around. Representative George A. Dondero of Michigan pressed Robins on the Umatilla project being "nothing more or less than putting the Government deeper into the power business." "Well that is true," Robins admitted, "but the Government is already in the power business on the Columbia River. I do not see how you are going to back out of it now." Dondero conceded the point.³⁵

Unfortunately, the hearings did not produce an endorsement from the Corps, and Representative Hill felt obliged to explain that this was due to the agency's tendency to be rather conservative in its statements. Hill did point the

committee toward the future, reminding it that the country was preparing for war by building warships and noting that the production of cheap hydroelectricity would create its own markets and increase usage. Although these hearings failed to persuade Congress to authorize Umatilla Dam, Hill's words were more prophetic than he perhaps realized. The invasion of Poland in September 1939, and the declaration of war by Great Britain put into motion national efforts to prepare for war conditions. The United States began an inventory of the nation's industrial capacity through a National Power Policy Committee under the Bonneville Power Administration. That committee analyzed national requirements for power, including new industries essential for defense. Among these was the aluminum industry. Its requirements for cheap, abundant electrical energy would bring about authorization for Umatilla Dam along with other hydroelectric projects in 1945. However, the dream of the inland navigation system to Lewiston, at one time the motivating force for river improvements, would have to wait until 1975 when the navigation locks at Lower Granite Dam were completed.³⁶

CHAPTER 6. ENDNOTES

1. U.S. Congress, House Document 704, *Report on Reexamination of Columbia and Snake Rivers*, 75th Cong., 4th sess., 1938.
2. Lukesh to Chief, 7 Dec. 1929, RG 77, NA, 111, 7249/71; Idaho Representative Burton L. French to Chief and endorsement by Lukesh, 18, 22 and 31 Dec. 1930, *ibid*, 7245/19.
3. Merritt, *Prelude to Slackwater*, p. 36; correspondence between Kipp and Lukesh 6, 12, 14, 17 and 20 Nov. and 29 Dec. 1930, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 5.
4. Quotation from Lukesh's letter of 17 Nov. 1930, *ibid*.
5. Dana to Lukesh and reply, 7 and 8 Jan. 1931, RG 77, *ibid*, Vol. 6.
6. W. A. Dodson of the Portland Chamber of Commerce to Lukesh, 20 March 1931; Kipp to Lukesh, 23 March 1931; Kipp to Maj. Oscar Kuentz, 27 March 1931; and Kipp to Lukesh and Kuentz, 18 May and 24 June 1931, *ibid*.
7. House Document 103, p. 4; U.S. Congress, Senate Committee on Irrigation and Reclamation, *Hearing on a Bill to Provide for the Improvement of the Columbia and Snake Rivers and a Bill to Provide for the Construction of Works for the Development of the Columbia River and Minor Tributaries and for other Purposes*, 72nd Cong., 2d sess., 1932, quoted in Merritt, *Prelude to Slackwater*, p. 34.
8. Statement of Black to Annual Meeting in Lewiston, 15 Feb. 1932, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 8; Kipp to Pierce, 28 Sept. 1933, E. B. Aldrich Papers, University of Oregon Archives, Eugene. Hereafter cited as Aldrich Papers.
9. Arthur Ward, Director, Western Inland Waterways Corp., Lewiston to Robins, 23 March 1933, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 8.
10. U.S. Congress, House Document 190, *SNAKE RIVER AND TRIBUTARIES*, 73rd Cong., 2d sess., 1934, pp. 3-4, 17-18. Hereafter cited as House Document 190.
11. *Ibid*, pp. 10-19.
12. Robins to Ward and Ward to Robins, 1 and 23 March 1933; Brief, Western Inland Waterways Corp., RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 8.
13. Aldrich to Roosevelt, 14 July 1933; and Ward to Aldrich, 19 July 1933, Aldrich Papers, Box 1. The Aldrich papers contain numerous letters of Oregon Congressmen, Umatilla Rapids Association and other river development groups. G. A. Hartman, President, Umatilla Rapids Association to Board of Engineers, 8 Aug. 1933; Brown to Hartman, 14 Aug. 1933, RG 77, NA, 111, 7249/278.
14. House Document 190, pp. 6-7, 9; *Portland Oregonian*, 11 Nov. 1933.
15. House Document 190, p. 9; U.S. Congress, House Document 395, *Preliminary Report on the Development of the Rivers of the United States*, 73rd Cong., 2d sess., 1934, pp. iii, 5, 7-8, 10-14, 357.
16. However, in Feb. 1935 Sen. McNary reported that Ickes was becoming more cordial toward open river improvements. See, *Walla Walla Daily Bulletin*, 27 Feb. 1935 and Merritt, *Prelude to Slackwater*, pp. 58-70. Merritt credits the Inland Empire Waterways Association as the decisive force in finally obtaining approval and funds for Umatilla, the forerunner of slack water development to Lewiston.
17. Secretary of War George Dern to Sam Bratton, Chairman, Committee on Irrigation and Reclamation, 22 June 1934, RG 77, Seattle FARC, NPD 501, HD 308A and 308B, Vol. 8; Chief of Engineers E. M. Markham to Sen. Steiwer, 31 Dec. 1934, RG 77, NA, 111, 7245/93; Dana to Barden, 16 March 1934 and Dana, "The West Must Farm," statement submitted in 1934 to the U.S. Senate Committee on Reclamation and Irrigation, RG 77, Seattle FARC, NPD 501, Navigation, Flood Control and Irrigation, 1936-1940, Vol. 1; Pierce to Hartman, 10 Feb. 1934, Walter Pierce Papers, "Columbia River Development, General Correspondence," University of Oregon Archives, hereafter cited as Pierce Papers; Merritt, *Prelude to Slackwater*, p. 109.
18. Water Resources and Power Division, Pacific Northwest Regional Planning Conference, *Proceedings*, Seattle, Washington, Dec. 12-13, 1934, pp. 32-33, 38, copy at Washington State University Library; Merritt, *Prelude to Slackwater*, pp. 72-73; Columbia Valley Association, "Annual Report," Oct. 1935, RG 77, Seattle FARC, NPD 503, "General 1931-1940," Vol. 4.
19. U.S. Congress, House Document 704, *Report on the Columbia and Snake Rivers*, 75th Cong., 3d sess., 1938, pp. 6-7. Hereafter cited as House Document 704.
20. Minutes, "Hearing before the Board of Engineers for Rivers and Harbors Held at The Dalles on Subject of Ship Channel in the Columbia River," 31 May 1934, typescript, copy in the Portland District Library; House Document 704, p. 21.
21. *Ibid*, pp. 8, 42-43.

22. Ibid, pp. 26–27, 33, 34.
23. Ibid, pp. 42–45.
24. Ibid, pp. 2–3, 13.
25. Secretary of War Harry H. Woodring to Sen. Royal S. Copeland, Chairman, Committee on Commerce, 16 April 1937; H. G. West, Vice-President, Inland Empire Waterways Association to Hill, 15 April 1938; Lee to Chief, 21 May 1938, all in RG 77, NA, 111, 7245/121, /368 and /375 respectively; Kipp to Pierce, 6 and 10 July 1937, Pierce Papers, “Columbia River Development, General Correspondence,” Box 1.
26. West to Pierce, 18 Dec. 1936; Pierce to West, 27 Dec. 1936, Pierce Papers, “Columbia River, General Correspondence,” Box 1.
27. Pierce to Charles Nellor, Port of The Dalles Commission, 21 Jan. 1937 with telegrams from W. S. Nelson, The Dalles Chamber of Commerce and Nellor, Pierce Papers, “Columbia River Development, General Correspondence,” Box 1.; Scheufele, *The History of the North Pacific Division*, p. 9.
28. Memorandum, Roosevelt to Secretary of War Woodring, 3 June 1928; Ross to Roosevelt, 31 May 1938, RG 77, NA, 111, 7249/378/1 and/2.
29. Lt. Col. Snow to Col. Charles Dasher, 23 June 1938, *ibid*, 7249.
30. Baker to Schley, 27 June 1938; Weaver to Lee, 28 June 1938; Snow to Ickes, 2 July 1938; Schley to Lee and Martin to Schley, 1 July 1938; and, Dodd to Schley, 31 Jan. 1939, *ibid*, 7249/388/1, /389, /390, and 416 respectively. Information from Gordon Fernald, retired Chief of the Engineering Division, North Pacific Division.
31. U.S. Congress, House Committee on Rivers and Harbors, *Hearings on the Improvement of the Columbia River (Umatilla Dam), Oregon and Washington*, 76th Cong., 1st sess., 17 April 1939, pp. 6–7.
32. *Ibid*, p. 4.
33. *Ibid*, pp. 8–9.
34. *Ibid*, pp. 15.
35. *Ibid*, p. 16.
36. *Ibid*., pp. 25–26. Walla Walla District completed three units at Lower Granite in 1975, and another three in 1978.

VII

FLOODS AND FLOOD CONTROL



Although most of the rivers in the Pacific Northwest are subject to floods, loss of life is rare and so far as known there has never been any need for flood relief that couldn't be met by the local interests themselves.

Colonel Robins,
February 1937



The 1894 flood in downtown Portland.

1. Introduction

Flood control is now accepted as a legitimate activity of the Federal Government. The Corps has built dams and levees, improved channels, and participated in flood abatement and rescue operations based on this mandate. At one time though, this aspect of water resource development was assumed to be the responsibility of local governments and communities. In the Pacific Northwest, floods had periodically disrupted agriculture and business, especially in the Willamette Valley. Yet even here the North Pacific Division did not include flood control as a benefit of multiple purpose projects, a position Congress also maintained until the Flood Control Act of 1936. With this legislation, Congress authorized the Corps of Engineers to investigate and improve waterways with a view toward lessening or preventing damage from floods.

In the Willamette Valley, the Division used this authority to begin planning for a comprehensive flood control project, an effort that local organizations strongly supported. The eventual success in winning approval and funding for the series of dams and reservoirs in the valley – over the initial resistance of the Chief of Engineers and the Board of Engineers – demonstrated the strong cooperative effort among local interests, state agencies, Congress and the North Pacific Division. The influence of the New Deal through the National Resources Planning Board was another important factor in maintaining momentum for the Willamette Valley project as well as other flood control works in the region.

In 1948 the disastrous floods that destroyed the town of Vanport on the lower Columbia River brought attention to the flood control problems in the Pacific Northwest, making it necessary to revise the 1945, 308 Report. Further, the inclusion of flood control in benefit-cost analyses helped considerably in justifying large dams on the Columbia River system after 1948. Flood control also influenced relations with the Bureau of Reclamation and the Bonneville Power Administration. The three agencies completed agreements for regulating reservoirs for the competing purposes of storing irrigation water and lowering water levels to make room for spring runoff.

In more recent years, achieving flood control by constructing dams and levees has been criticized. Building costs on these works have skyrocketed and annual maintenance is expensive. Population growth, increased land values, and lack of local zoning ordinances have encouraged development of flood plains. When floods do occur, the damages are exceedingly high. In addition, environmental issues, such as those surfacing in the Upper Snake River Valley around the scenic Jackson Hole country in Wyoming, have made it necessary to reevaluate flood control benefits in terms of recreational and wilderness values. Despite these problems, the Corps' participation in flood control and flood fighting has greatly expanded since the 1960s. Emergency Flood Fighting Funds assist rescue and reconstruction work; the Flood Plain Management Services conducts studies for local governments; and the Reservoir Control Center at the Division's Portland office warns residents of flood danger and adjusts reservoir levels to abate flood damage.

2. Floods and Flood Control Activity Before 1945

Winters in the Pacific Northwest sometimes bring a sudden influx of warm westerly winds known locally as

chinooks, which rapidly melt the snowpack and cause runoff over the still frozen ground. This first snowmelt, oftentimes accompanied by warm rain, swells tributaries and major rivers, causing floods of various proportions. In the days before dams, flood waters of the shallow and meandering channels of the Willamette River often washed away farmland and parts of towns and landings. Such a flood occurred in December 1861 after an unprecedented rainfall. Champoege, in the northern part of the valley, was covered with seven feet of water, which left the site "as bare as a sand beach" and swept away 200 houses. Salem, less exposed to the flood waters than other towns, lost much of its business district. And, at Linn City near the Willamette Falls, a spectator watching the water rising at a rate of almost a foot an hour eloquently reported, "the ceaseless roar of the stream made a fearful sort of elemental music . . . While the darkness was made more visible by the glare of torches and hurrying lights."¹

On the Columbia, periodic floods in the 1880s and in 1894 had threatened to sweep away the construction works at the Cascades Canal. This unanticipated danger revealed the inadequacy of existing data on height, behavior and velocity of the river during a flood. On the lower Columbia, flooding of dairy farms located on bottomland occurred regularly, generating a local system of dikes and diversion channels. No one computed the toll of property losses and human life for the earliest Willamette floods, and Columbia flooding generally did little damage in the 1800s because of small populations and lack of development. The 1903 flood on Willow Creek, a Columbia tributary above the town of Heppner Oregon, was a different matter. By severely damaging an entire community and killing 247, the flood elicited massive regional donations of money and clothing and received widespread publicity. Nonetheless, in those days flood control was considered a responsibility of local government and early flood protection consisted primarily of residents taking the precaution of building and farming above the flood plain, or building small levees and strengthening river banks. The absence of accurate data about floods and the areas subject to flooding, along with the lack of civic initiative in restricting settlement in these areas, led to ignorance and complacency about the danger. This changed as the Willamette Valley and Columbia Basin gained in population, agricultural and commercial development and as potential losses increased.

Floods along populous, developed, flat lands on the lower Mississippi led to the first federal interest in flood control measures. In 1874 the Corps produced a report recommending a plan to reclaim flooded lands and criticizing the lack of coordination among local levee programs. That report led to the formation of the Mississippi River Commission in 1879. In 1893 Congress authorized the creation of the California Debris Commission which was to prepare flood and navigation plans for the Sacramento and San Joaquin rivers. Federal interest in flood control expanded in 1917 after two major Mississippi River floods in 1916 and 1917. This flood control act authorized the Corps to plan and construct flood control works, excluding reservoirs, on the Mississippi and Sacramento rivers. The act also provided that the state or locality should pay at least half of the costs. Almost 20 years later, again in response to major floods, Congress established a national flood control program with the Flood Control Act of 1936. This act assigned jurisdiction over investigations and improvements of waterways to the Corps and watershed protection to the Department of Agricultural. The 1936 Act also authorized examinations, surveys and several flood control projects in the

North Pacific Division. Plans completed under that act and subsequently authorized included the Willamette project. The assignment of joint responsibility between the Corps and the Agriculture Department's Soil Conservation Service to carry out the flood control investigations and activities created another layer of overlapping functions. In other divisions within the Corps, the split assignment caused sharp disagreements which led to a deterioration in the relations between the two agencies. In the North Pacific Division, on the other hand, years of experience in cooperating with other agencies and the mutual respect and personal good will between members of the two agencies led to an amicable relationship.²

On a national scale, this legislation limited local contributions for lands, easements, and rights of way to one-half the project cost. It required reimbursement only for construction of levees and floodways, considering water ways as free public highways with widespread, general benefits. The requirement for local contributions was dropped in 1938 after major floods occurred in 1937 and 1938.³

The Pacific Northwest had a history of severe floods although damages were much less severe than those suffered in the Mississippi Valley. The Willamette Valley received the most damage. In 1881, 1890 and 1927 water rose 10 feet above the river banks at Albany, inundating 273,000 acres, and through 1933 the Valley sustained \$4,160,000 in flood damages. Annual flood damages were estimated at \$1,643,000. During the "308" investigations of the late 1920s, Oregon politicians urged the Division to include flood control in its surveys of the lower Columbia. Although the Portland District did some field work, Colonel Lukesh declined to study flood-related issues, namely the relationship of dredging to flooding and the protection of farmlands from floods. The Division took a dim view of local pressure groups attempting to force the Federal Government to construct levees on the lower Columbia like those the Corps had built in the Mississippi Valley. Lukesh confided to the Chief that including flood control in the "308" surveys would embarrass the Engineer Department by fostering expectations that the government was planning to undertake flood control work.⁴

The Division clearly stated its opinion that flood control was not an important issue on the lower Columbia. This position reflected contemporary thinking that flood zone residents were responsible for their own flood problems. The 308 Report stated that the Columbia flowed through a well-defined and deep channel, only occasionally overflowing onto low lands. On the lower Columbia and throughout the Pacific Northwest, the Division maintained that flood control should not be included in a multiple use project and that it was purely a local and state concern.

By the 1930s, the Pacific Northwest Regional Planning Commission recognized the need for and benefits of flood control in the region. At a December 1934 conference, the subcommittee on flood control raised the issue of the need for all levels of government to cooperate in planning on a regional and national basis. As a means of meeting this obligation, E. F. Banker, Washington State Director for Conservation and Development, recommended that each community be provided with a means of analyzing its local problems and coordinating the solution with district, state and regional plans. Banker acknowledged the work of federal agencies like the Corps in collecting stream flow data and investigating reservoir sites. However, the most pressing problem was determining how local and state entities could pay for flood protection. As one

participant commented, "We have exhausted almost every means of raising any money through government, state or county." Colonel Robins, who was chairing the meeting, responded that the committee's report would recommend the amount local interests should pay for flood control. Sympathetic to meager budgets during this time of economic depression, he suggested that local interests go to Congress and "argue about it." He added that "What you get from Congress is up to you," and that funds might be available from the Works Progress Administration.⁵

The final report of the 1934 conference attempted to reconcile the need for immediate flood relief with financial realities. It recommended that state and local interests undertake a program under federal sponsorship for temporary protection of critical areas. It also advised that the War Department cooperate with these government bodies in completing a comprehensive plan, including an economic analysis. Costs would be borne by those who benefited – federal, state and local interests.⁶

The Willamette River Valley was the first area in the Pacific Northwest to obtain a flood control project, but until Congress passed legislation for flood control, the Division could not intercede. Like the 308 Report on the Columbia, the "308" for the Willamette considered flood control a local responsibility and concentrated on navigation improvements. The Portland District Engineer stated that there was no flood problem of sufficient magnitude to justify formulating a general plan for flood control. Despite the District's and Division's assessments that flood damages to agriculture and crop losses were insignificant, residents along the river protested the government's neglect of the problem. They requested Congressional legislation authorizing the Army Engineers to assist them. Floods caused serious erosion of hop and fruit fields, but a 1934 inspection by District Engineer Major Charles F. Williams found that erosion had no effect on channel navigation and therefore the District could not stabilize the banks under its existing authority.⁷

Frustrated by the futility of their own efforts to dike and stabilize the river banks and by failure to obtain local financing for larger works, valley residents eagerly sought assistance through New Deal public relief moneys. They hoped these funds would supplement the \$250,000 they had already spent on flood works over the past 40 years. Anticipating the receipt of public works funds, the Chief's Office in 1933 instructed division engineers to undertake the most earnest efforts in expediting emergency projects. General Lytle Brown warned that any failure to get to work promptly and to approach the work vigorously would surely invoke criticism greatly injurious to the Corps. He sternly cautioned against creating grounds for any criticism. "I desire that the work of this organization be outstanding at this time in its energy and promptitude."⁸

In response to requests from the Chief's office, the Portland District prepared a list of projects for the emergency construction program which included bank protection on the Willamette. Numerous flood control and other projects in Oregon and Washington were submitted throughout the 1930s. The larger ones – construction of Umatilla Dam and lock, investigations of thirteen other dam sites on the Columbia and Snake Rivers, and modification of the locks at Celilo – did not receive relief funds. However, the Federal Emergency Relief Appropriation Act of 1935 contained \$300,000 for bank protection on the lower Willamette.⁹

It was the Flood Control Act of 1936 that shifted work from small, emergency relief projects to comprehensive

planning for larger projects. After the act was passed, the Chief's office directed district engineers to prepare another list of projects for flood control and to promptly inform him on which dates definite projects would be submitted. Although the act contained no funds for carrying out the projects, the Division viewed preparing surveys and plans for such works as highly desirable. Robins had noted in the 1931 Willamette survey that field information was very sparse and lacked detail. Portland District Engineer Major Kuentz was frustrated by orders from the Chief's Office to immediately undertake a sophisticated field investigation on the lower Columbia and Willamette rivers and their tributaries. The District lacked adequate funds to collect this data. He noted that the right-of-way surveys and proposed flood control improvements on river banks, levees and drainage systems would have to be completed before local interests could be advised as to what was needed and before the Corps could begin construction. The Chief's Office quickly approved a sum of \$70,000, but only for the lower Columbia. Some survey money had been allotted earlier from public work funds, but the problem was finding qualified workers from the relief rolls or elsewhere who would accept the minimum wages.¹⁰

The next flood control act of August 1937 authorized investigations of watersheds listed in the "308" legislation. The Chief's office directed the Division Engineer to supervise the surveys and preliminary examinations of 18 rivers and their tributaries throughout the North Pacific Division. It again requested a prompt report on the estimated costs and dates of the surveys. Because Congress did not allocate additional funds, some surveys were delayed and others combined with surveys already underway.¹¹

Although numerous small flood control projects were completed under the Emergency Relief Act, the solution to preventing or minimizing damages rested in a comprehensive program authorized and funded by federal legislation. For example, both the Oregon State Planning Board, formed in 1935, and the Division recommended that Willamette Valley flood control be accomplished through reservoirs in the headwater rather than by relying on channel and riverbank work. Oregon elected officials, farmers, newspapers and chambers of commerce seconded this viewpoint. But the \$51 million required to construct the seven multiple-use reservoirs was not going to be obtained from relief funds or local revenues.

The Board of Engineers at first opposed the proposal for a Willamette project. This refusal prompted a meeting in Salem in December 1937 to request a reassessment of the project's benefits. The organizer of that hearing was R. H. Kipp, the energetic head of the Columbia Valley Association. In preparing for the hearing, Kipp sent circulars to 350 organizations asking them to write the Board and attend the Salem hearing. Gratified by the response, Kipp reported to Oregon Representative Walter Pierce, "This is the first time the Willamette Valley people were ever organized and ready to fight for something." After the hearing Senator McNary and Representatives Pierce and James Mott continued Kipp's efforts. With his assistance, they persuaded the Board of Engineers in June 1938 to approve immediate construction of the seven reservoirs. They also continued their efforts to reduce the amount Oregon was to contribute to the project.¹²

The Corps' final report with recommendations for the seven reservoirs represented a crucial turning point in water resource development. This new position was buttressed by more data, by experience gained in building levees funded through the New Deal public works programs, and by the 1936 Flood Control Act. It was also influenced by a consortium of business, agricultural and political interests which demanded federal assistance. In the Division's 1938 report, Colonel Robins attributed the serious flood problem primarily to frequent overflows from normal runoff and not from infrequent large floods. This statement represented a different perspective from his earlier conclusion that flood damages were not serious. He also advised that the recurrence of floods the size of those in 1861 or 1890 would be a catastrophe, causing up to \$10 million in damages, mostly to farmland. He estimated that a flood on the scale of the 1927 one could be expected every five years and would partially or completely inundate 7,000 farms, 8 cities and towns, and 3,000 homes and stores. Robins also observed that during the past 30 years subnormal rainfall and runoff had reduced flooding, but a cycle of wet years would threaten rural and urban developments. Because flood damages would increase with the further expansion of agriculture and industry, Robins cautioned that additional flood protection was urgent.¹³

The Division also concluded that although levees were less expensive than reservoirs, reservoirs presented the most practical solution. Moreover, 65 percent of storage could be used for other purposes and there would be no need for supplemental levee improvements. In proposing a total of seven dams for the Willamette Basin, Robins recommended that initially only three be provided with power facilities. Generators would be added later when markets had been developed. The three recommended power sites were Lookout Point on the Middle Fork of the Willamette, Quartz Creek on the McKenzie, and Detroit on the North Santiam. His plan also recommended bank protection works along the main stem of the Willamette, channel improvement between Albany and Willamette Falls, reconstruction of the Willamette Falls locks, and facilities to conserve fish. The report estimated flood protection benefits at \$1,344,000, reduction in flood damages from \$1,693,000 to \$349,000 and an annual increase in property values of \$182,000. In addition, releasing water from the reservoir would float sawlogs downriver to Portland and provide irrigation water for small farms during the dry summer months.¹⁴

The recommended plan for the Willamette Basin was subsequently modified. Sweet Home Dam on the South Santiam River was not constructed because of development in the reservoir area. Green Peter Dam on the Middle Santiam was built instead. The Quartz Creek project was also abandoned because of fishery and environmental concerns. Cougar Dam on the south fork of the McKenzie River was substituted for it.¹⁵

One unresolved issue was how to apportion project costs. Although public hearings had disclosed the willingness of local people to contribute toward the project, Colonel Robins advised that local governments probably would not be able to pay for relocating railroads. Nor did he believe they should be asked to, in view of the project's general benefits to navigation and potential reimbursements from irrigation and power sales. He advised that the Federal Government should construct the dam and operate and maintain the reservoirs in order to

Cottage Grove
Damsite, 1939.



protect the public's interest. Another project cost would be damage to fish. Robins asserted that preservation of fish life on the Willamette and its tributaries should be viewed as an interstate, if not a national, concern. He therefore recommended that the Federal Government bear the costs of constructing fish hatcheries and other facilities for propagating fish at an estimated cost of \$95,000. He also believed that agencies operating existing facilities should absorb the increased operating costs.¹⁶

Although Robins recommended local interests pay only \$10,134,000 of the \$51 million project, the Chief and Board of Engineers disagreed that Oregon should be excused from bearing the costs of railroad relocations, fish facilities, and operation and maintenance of the completed dams. They insisted that provisions of the Flood Control Act covering local cooperation requirements be complied with thereby increasing Oregon's share to \$18,645,000. Kipp's forceful lobbying for the Willamette Valley Project Committee and the influence of Senator McNary and Congressman Nott persuaded Congress to reduce the state's contribution to \$1,000,000. McNary compared the Willamette project to the TVA where the federal government had funded the entire project.¹⁷

An essential argument in winning Congressional approval and funding for these multiple purpose projects was the economic benefit to the region. The report acknowledged that it was difficult to estimate future growth or evaluate benefits resulting from the dams. Chief of Engineers General Julian Schley described the Willamette Basin as comparatively undeveloped but with great future possibilities. He further stated that the agriculturally rich valley was expected to develop more rapidly than the Columbia Basin, contingent upon the provision of flood protection. Of the two plans, the middle Columbia-lower Snake and the Willamette, the Willamette offered greater benefits from flood control. Consequently, the Corps was more enthusiastic about proceeding with the construction of the seven reservoirs. Yet, even the direct benefits from flood control were not sufficient to persuade the Board of Engineers and the Chief to

recommend immediate adoption of the comprehensive project. Although the Board considered the general plan as well conceived and as a good basis for future developments, it maintained that the direct benefits from navigation and irrigation were not commensurate with the costs. Nonetheless, the Board and General Schley agreed to consider the intangible and future benefits of protecting agricultural land from floods and the potential of developing large quantities of power as justifying the project.¹⁸

Now proponents pushed to expedite the project and receive federal funding. The Willamette Valley Project Committee mounted a mail campaign in late 1938. The State of Oregon created the Willamette River Basin Commission in 1939, and its planning board described the Willamette Valley project as one of the first proposals for correlating land and water development into a broad, multiple benefit project. The motivating force for this 1938 optimism was economic opportunity for Oregon residents and for newcomers migrating from the dust bowl and other depressed areas. As an off-shoot of New Deal planning commissions, the Oregon Planning Board contended that the "indirect human and social benefits derived from conserving the Valley's resource and strengthening its economic foundation can scarcely be overestimated."¹⁹

The Corps was a welcome partner in this enterprise of regional planning for economic-social objectives. Colonel Robins, a friend of many of the project's backers, wrote Senator McNary that the reservoirs would create "increased prosperity not only for the farms throughout the valley but in the cities and towns as well." Congress agreed and authorized the project as developed by the Division in the 1938 Flood Control Act. Portland District began constructing three of the seven dams, Fern Ridge, Cottage Grove and Dorena in 1941, and two additional ones after the war. It also helped valley residents develop a warning and evacuation system as part of a total flood protection program. This cooperation helped convince Oregonians to support additional dams. In 1948 Portland District Engineer Colonel Orville Walsh could point out that since 1943 Fern Ridge and Cottage Grove Dams had



View of the camp, spillway excavation of canyon walls at Mud Mountain Dam, 1940.



Drillers and power men at the site of Mud Mountain Dam, 1939.

prevented \$1,656,000 in flood damages despite five major floods during those years. Although the public generally supported continuing the project, some recreational and wildlife interests worried that the dams might damage anadromous fish runs. However, in the 1940s the benefits of flood control muffled these objections.²⁰

In other areas of the Pacific Northwest, flood control work was restricted to small projects. The Division's 1938, 308 Report had discounted flood control on the Columbia as a federal responsibility or a serious problem. It concluded that flood storage behind the middle Columbia or Snake dams was not warranted. "Provisions for flood control," Colonel Robins asserted, "cannot be made at costs commensurate with benefits." Portland District provided flood protection by constructing levee embankments, pumping plants, drainage ditches, pile dikes and bank revetments along the Columbia. In the Seattle District, recurring floods damaged farms and buildings, and Robins described the Puget Sound area as one of four most likely to require flood relief. On several short rivers draining into the Sound, flood stage was reached quickly but lasted for only a few days. Because the floods were caused by unpredictable chinooks, it was thought impossible to plan for emergencies or even predict flood crests. Seattle District used public work relief funds on several small rivers in western Washington and on the Puyallup and the Yakima, east of the Cascades. It also activated and administered under the WPA program an emergency flood control project for all streams in Washington. Then in 1940, the District began work on a major flood control project, Mud Mountain Dam, to protect the industrial Tacoma area. Completed in 1953, it was at the time the world's highest earth and rockfill dam, extending 425 feet above bedrock.²¹

With flood control projects underway in the Willamette in the late 1930s, the Corps reevaluated its policies for flood control and other aspects of multiple purpose projects. The Chief's office sent Major A. B. Jones to the Division in 1938 to discuss guidelines and redirections. A major concern was

cutting costs of flood control surveys. Unlike previous surveys for rivers and harbors, those done for flood control could not be charged against project costs. It was necessary to convince the Bureau of the Budget that the Army Engineers were not abusing their authority in allocating money for flood control surveys. In order to achieve the greatest economy, Jones advised against the traditional reports with their inventories of natural resources and other information such as Captain Symons prepared in 1882. The days of the comprehensive survey were over; there would be no more reports weighing 27 pounds. "Monuments belong in a cemetery," Jones quipped. "We are not that dead yet and we do not need any monuments . . . People in Washington think times have come when streamlining is in style . . ." Redundancy was also to be avoided, and Jones questioned how long the Corps could go on writing reports on the same stream and getting rid of the same problem. He directed the Division to give its attention to the most favorable solutions and concentrate on the main issues. However, engineering solutions for unfavorable projects should be sound in case Congress later authorized them, a situation that had often occurred.²²

The conference revealed new factors that would shape future reports ranging from increased salary costs to higher real estate values to integrating flood control benefits with other project benefits. In regard to flood control policy, Jones acknowledged that many current problems stemmed from lack of Congressional direction. Congress had been stewing on flood control policy for ten years, and Jones noted that it was no black eye that the Division could not keep up with flood control policy. In addition, the wording of resolutions requesting a review was frequently vague or the review mandate itself very broad. The Division was attempting to solve this problem by having the districts contact the Congressman sponsoring the review. Jones also advised the Division that he believed Congress intended flood control legislation to favor multiple-purpose and not single-purpose projects. Consequently, the preliminary examination should reflect this direction. The emphasis on multiple purpose projects was the direction for future water resource developments. "If we don't do it," Colonel Lee interjected, "somebody else will."²³

The North Pacific Division's flood control surveys in the late 1930s and early 1940s necessarily involved coordination and data exchange with the Bureau of Reclamation because of shared interests in several river basins. Under the directives of the National Resources Committee, investigations of one agency were routinely reviewed by other interested federal agencies. In the Pacific Northwest, such reviews included the Boise River; the upper Snake from Jackson Lake in Wyoming to Weiser, Idaho; the Palouse River in Idaho and Washington; and the Clark Fork in Montana, Idaho and Washington. Still, there was tension between the two agencies during investigations and interagency reviews. For example, in 1939 Harold Ickes, Chairman of the National Resources Committee, complained to General Schley that the Corps had made no arrangements for the active cooperation of the Bureau in two surveys recently completed on the Palouse and Clark Fork. The Division explained to the Chief's office that it routinely studied the Bureau's reports on irrigation whenever the possibility of combining irrigation with flood control arose. In these two surveys it had taken particular care not to overlook any possibilities for both uses.²⁴

In order to circumvent further criticism, the Chief's office requested the Division to hold joint conferences with the

Bureau in 1939 and 1940 on problems and progress in multiple purpose project reports, and on flood control investigations. Five conferences were held on the Boise River report during fall and winter of 1939, and disagreements that arose over flood damage and project costs were amicably resolved by compromise. During a July conference the two agencies also discussed other multiple purpose projects on river basins and the Snake River in northeastern Oregon. They agreed that such cooperation in planning multiple-use, rather than single-purpose projects, benefited both agencies in obtaining approval from Congress.²⁵

The Department of Agriculture also participated in the conference because of its responsibility for flood control matters relating to land use practices such as soil conservation and watershed protection. In August 1937, Colonel Robins requested district offices to cooperate with the Forest Service in preparing a priority list of streams to be investigated. In September of that year, the two agencies held a joint hearing on the upper Snake River. The Federal Power Commission was another cooperating agency in water resource planning. In fact, the Commission and the Corps had prepared the original House Document 308 that formed the basis for comprehensive reviews of river and tributaries. Being responsible for approving power structures in dams, the Federal Power Commission carried out its own investigations. Through its field offices, it maintained close contact with the Division and district engineers as well as with the Bureau's divisional headquarters at Boise and the Bonneville Power Administration.²⁶

3. Flood Control After World War II

After World War II, Congress authorized numerous multiple purpose dams in the Pacific Northwest. With federal commitment to large flood control projects, the Portland District continued the series of dams in the Willamette Valley with new projects authorized after 1950. In the Columbia and Snake basins, flood control dams were more difficult to secure. Unlike the Willamette Valley, these drainages cut through more than one state, flood storage competed with other uses, and water was more scarce in the arid lands.

The impetus for flood control planning outside the Willamette Valley resulted from the disastrous 1948 floods which destroyed property throughout the Pacific Northwest, taking several lives in the town of Vanport on the lower Columbia. As a result, the public, Congress and the Administration demanded flood control. President Truman ordered a reevaluation of the 1945 comprehensive survey of the Columbia and tributaries in view of the flooding. He further directed the Corps to coordinate its survey with a similar one prepared by the Bureau of Reclamation. Including flood control in a major water resource report signaled the importance of this benefit in future multiple-purpose planning. Cooperation also meant that where the Corps and Bureau operated dams on the same rivers, it was necessary to work out mutually acceptable procedures. The agencies made one such agreement in 1950 for Lake Roosevelt behind Grand Coulee after a winter and early spring flood threat on the upper Columbia. The Division invited representatives of the Bureau and the Bonneville Power Administration to meet and discuss the overall problem as well as specific ones. Two conflicting interests surfaced. Anticipating floods from the spring snowmelt, the Corps wanted to lower the reservoir as much as



Levees along the Snake River of southeastern Idaho in the Heise-Roberts area, 1967.

possible, but this would mean discharging water over the Grand Coulee spillway because the outlet conduits were not operable. The spilling would impede or slow contractors for the Bureau who were working on the channels below the dam. In addition, the drawdown would suspend logging operations around Lake Roosevelt. After arguing that this request was not covered under the present authorization, the Bureau did agree to draw down the reservoir and increase storage. It also agreed to consult daily with the Division on operating 12 large irrigation reservoirs in the upper Columbia and upper Snake basins. The agencies praised this procedure as a means of maintaining excellent liaison between them, and they agreed that coordinating storage in these reservoirs would prevent flood damages of \$5.6 million.²⁷

The Corps achieved flood control on the Columbia system through headwater storage on the upper Columbia and its tributaries including the Kootenai, Pend Oreille, and Clearwater rivers, and with dams on the Snake and its tributaries in southern Idaho. Here flood control presented specific problems because of overlapping irrigation and flood control needs downstream. Moreover, the lack of navigable rivers and expanding irrigation projects had given the Bureau control over most water projects. Before World War II Congress had authorized the Corps to build levees and improve the channel above Idaho Falls, and in the 1950s the new Walla Walla District began constructing Lucky Peak Dam on the Boise River in central Idaho for flood control and irrigation. Idaho's primary interest in the Snake watershed was in developing irrigated farmlands and preventing floods, two compatible benefits in that region because flood storage would conserve irrigation water for summer use. In 1954 the Chief's office estimated that 85 per cent of flood damages along the Snake occurred in the central and upper portions of the basin and that ultimately 4 million acres would be under irrigation.²⁸

In the 1950s the Corps began playing a larger role in water resource development in the upper Snake although irrigation

storage retained its priority. In 1953 Chief of Engineers General Sturgis emphasized that future irrigation depletions of whatever magnitude should have priority over all downstream users. It was the one crucial policy point that convinced Idaho to accept the Corps' 1950 report on flood control in that region.²⁹

Oliver Lewis, an engineer in the Walla Walla District and an expert in flood fighting and levee and channel works, considered periodic flooding in the Snake Basin in eastern Idaho as the largest agricultural flood problem in the Columbia watershed. He confided to General Sturgis that farmers who had invested heavily in irrigation facilities complained that the Division had given insufficient attention to flood problems and storage needs in the upper Snake. The Chief's office refuted his charge and pointed out that future storage projects in that region would have to be justified by other uses, including power. Sturgis personally assured Lewis that the Chief's office would continue to support flood control in Congress.³⁰

Recognizing the need for flood control in this area, the Senate in 1954 authorized the Board of Engineers to review a 1950 report on the upper Snake River Basin. Later Congress allocated funds for an expanded study by the Walla Walla District and the Bureau of Reclamation. Each agency produced separate reports which a joint committee coordinated into one. The six-year study of over 500 projects was completed in 1962, but it was never published as a Congressional document. Serving as a miniature encyclopedia for state and federal agencies, the study did initiate a series of several interim reports and, most important, a regional water plan consisting of both single and multiple purpose projects. Among other recommendations, the 1962 study urged basin-wide integration of existing and future water resource projects. It advised that power be sold at cost to irrigators who pumped water, and that sales of surplus power could assist future irrigation projects.³¹

The joint recommendations for multiple-purpose storage encountered a split between Idaho irrigators and some Wyoming residents. Although Idaho interests favored flood protection works, those from Wyoming opposed storage projects as infringing on wildlife, fish, and recreation in the Yellowstone and Teton national parks and in Jackson Hole National Monument. The Corps and Bureau had anticipated resistance to altering the character of this remarkable wilderness area. They proposed at the outset of the report that they would not recommend any significant encroachment on national parks and monuments.

The Jackson Hole area in northwestern Wyoming is a prominent example of conflicting values – agriculture and scenic – surrounding structural flood control measures. The Snake and lower Gros Ventre rivers meander through the flat valleys of hay fields and meadows. During run-off, the rivers previously formed new channels, depositing accumulations of gravel over large areas of the fertile bottom lands. In 1951 the Walla Walla District began extensive levee and channel works along the thirteen-and-one-half mile stretch, completing the project in 1964. When 1965 floods threatened to break the levees, the District began investigating the possibility of extending the levee system ten miles farther downstream. The problem was how to fund the work.³²

In 1967 Congress authorized the District to use emergency flood fighting funds, known as Public Law 99 Funds, to study methods of reducing the high costs of the levee project. The report proposed four alternatives for rehabilitation, but the Chief's office rejected them. In 1972 it organized a joint meeting with the North Pacific Division and the Walla Walla District to review the flood problem in Jackson Hole. Representatives from these three offices met with local property owners and county residents to discuss alternatives ranging from designating this part of the Snake as a wild river to various engineering solutions. The major problems were high maintenance costs and emergency repairs which local interests were unable to fund. The participants agreed that the levees had to be maintained because of the rapid development of this recreational area. However, the District had to use PL 99 funds for the repairs, which in the period 1965–1972 totaled \$408,000. The Chief's office objected to using emergency funds for annual repairs and maintenance, claiming such use was not within the spirit of the law. It also cautioned that annual appropriations from Congress were not a practical solution for financing this work. Furthermore, Wyoming consistently opposed constructing flood control dams because of the area's scenic values and because it would not profit from storage of irrigation water. Nor did the suggestion of increasing flood storage at the Bureau's Palisades Dam and Jackson Lake reservoir find support. The proposed engineering solutions were either too costly, damaging to the environment, or expected to arouse public opposition. Some feared that continuing present maintenance and repair work would produce a false sense of security and encourage development of flood areas.³³

The recommendation to return the river to its wild state was deemed impractical because of high land values. Moreover, local interests who wished to preserve the scenic values of Jackson Hole did not want to open up the investigation to a full scale survey report involving what they termed "environmental emotional concerns." In view of these attitudes, the Corps decided to endorse a report on the present levees, explaining the deficiencies of the design. This would hopefully avoid re-opening issues which had been settled, such

as land enhancement and levees versus the wild river designation.³⁴

Because the flood problem in Jackson Hole remained unsolved, the Division was forced to continue using emergency funds to repair the levees. In 1977 and 1978 the Chief's office protested this abuse of emergency authority. It denied requests for PL 99 funds maintaining that local interests and not the Corps were responsible for this work. This position conflicted with the Division's study which found periodic rehabilitation as the least costly plan with an acceptable low risk of failure and recommended that local interests should not be expected to assume these costs.³⁵

Structural solutions to floods were acceptable downstream. The Walla Walla District built Ririe Dam in 1972 for the Bureau of Reclamation, and the Bureau built a second project, Teton Dam, a few miles upstream from Ririe on another tributary of the Snake. Tragically Teton failed in June 1976, flooding downstream towns and farmlands. Reacting to heightened anxiety about the safety of dams, Congress quickly passed the Dam Safety Act and directed the Corps to inspect all federal dams. Lacking funding, the Corps first prepared an inventory that classified dams according to potential loss of life and property. The second stage was inspection of dams the survey had identified as hazardous.

With completion of several storage projects in the Pacific Northwest, figures on flood control benefits were impressive. The series of five dams and reservoirs in the Willamette Valley reached maximum storage levels in December 1955, preventing damages estimated at \$12.9 million for that year. Ten years later during the severe Pacific winter storms of 1964–1965, the seven storage reservoirs prevented damages of \$514 million, \$4 million of which was attributed to bank protection, levees and channel improvements. In Washington and Idaho, reservoirs and flood control works were estimated to have prevented an additional \$26 million in damages during that same winter.³⁶

Dams and reservoirs are not operated for flood control alone. Whenever possible they are managed to provide the greatest amount of benefits for a variety of water resources needs. Since these needs often conflict with each other, close coordination is required among the various resource agencies and interests. One example of close interagency coordination was the 1950 agreement between the Corps and the Bureau on Roosevelt Lake behind Grand Coulee Dam. The cooperation continued in the 1950s at Hungry Horse in Montana and Lucky Peak on the Boise River. The effects of the interagency coordination of reservoir levels on flood control earned the praise of Wyoming Governor Milward L. Simpson. In 1956 he wrote to Walla Walla District Engineer Colonel Myron Page, "I know that the State of Wyoming and the downstream states are grateful to you for your work and for your close cooperation with the people of the Valley and the Bureau of Reclamation. I want to give credit where credit is due . . ."³⁷

In coordinating reservoir levels as part of its flood control responsibility, the Division in 1968 established a Reservoir Control Center for the Columbia Basin and adjacent coastal streams. The functions of the Center reflect the Division's comprehensive responsibilities in the Pacific Northwest and the need for cooperation among the various owners and coordination in the uses of the basin's water resources. In addition to flood control, these include navigation, fish passage, recreation, irrigation, and water quality. The Center is organized into four units: reservoir regulation; special studies on regulation procedures; data control; and communication. On a routine basis the Center is responsible for flood

control regulation of federal and non-federal reservoirs, and it shares in planning and directing operations of reservoirs in Canada under the Columbia River Development Treaty. It schedules power generation at Corps projects in collaboration with the Bonneville Power Administration and coordinates reservoir regulation with fish agencies, navigation companies, and utilities, including the 18-member Northwest Power Pool. Because of the Reservoir Control Center and interagency cooperation, the Division was able to prevent a major flood in the spring of 1974. Mobilizing a force of 225 employees, the Division provided technical assistance and flood fighting expertise for two separate floods. The operations averted an estimated \$14 million in damages at a cost of \$1.5 million. The Corps recognizes the Control Center as a leader in its field and among the best in the world, attracting foreign visitors from as far away as the Soviet Union and the Peoples Republic of China.³⁹

Another important flood prevention program was Operation Foresight. The Chief's Office created this program for the northern tier states in 1969 as a means of preventing expected flood damage from above-normal snowpack runoff. The Division reported 109 separate jobs completed at a cost of 1.5 million dollars. Estimates of damage prevented totaled 4.2 million dollars. During this program, survey teams inspected flood control works and notified local, county and state officials of danger areas. The Corps constructed, raised or reinforced levees and built diversion channels. It widened, deepened or cleared existing channels of snags to increase stream capacity. By 1969 there were 104 projects in the Pacific Northwest states under this pre-emergency planning, ranging from the stockpiling of sandbags to building new set-back levees. The cost of Operation Foresight was estimated at \$1,528,000, but the damages prevented were \$4,259,400.³⁹

Another program instituted to reduce flood losses is the Flood Plain Information reports. In the 1960 Flood Control Act, Congress directed the Corps to prepare reports on flood hazards and potential damages for communities susceptible to flooding with populations of 2,500 or more. Of the 185 communities located in the North Pacific Division, the Division gave top priority to those expected to expand onto undeveloped flood plains. In this way, the towns and cities could adopt regulations before flood plains became crowded. The Division also coordinated the Flood Plain Management Service with other activities, such as a review of survey reports, in order to present flood plain management as an alternate solution to dams. In collecting and disseminating the data, the Corps worked closely with state and local governments to encourage and guide wise use of flood plains. In 1968 Congress passed the National Flood Insurance Act which also encourages the wise use of flood plains. The Act requires residents of these areas to share in the costs of flood fighting and repairing damages. The Corps participates in this program by preparing flood insurance studies at the request of the Department of Housing and Urban Development which administers the program.⁴⁰

By September 1969, the Division had completed 25 flood plain information reports which diverse government entities used in their land-use planning. In 1966, the Bureau of the Budget task force on federal flood control policy, in an effort to increase the scope of the flood control programs, had directed that all communities of 2,500 or more on flood plains should have a report; but funding levels fell behind the proposed ten-year schedule.⁴¹ In addition, flood plain

Rebuilding levees on the Snake River after the June 1976 flood, Walla Walla District.

management studies and attempts to regulate flood zones were not always popular. Former Division Engineer General Richard Wells commented in an interview:

Of course the Corps of Engineers for years has been advocating that people do not build on flood plains. We did a lot of Flood Plain Management Studies to show places where you ought to stay out, and there you get on the opposite side. I've run public meetings where I've been attacked as being anti-development and anti-the-people by telling them that an area was going to flood when obviously it wasn't going to flood because it hadn't flooded in the last two years. So our studies would show that water can get up in the air ten feet or something like that, and they ridiculed it.⁴²

The program of flood plain mapping and national flood insurance represented substantial progress. However, in one area of the Pacific Northwest it complicated the issue of flood control. This place was Heppner, Oregon, the site of a tragic 1903 flood that took 247 lives at a time when there was no federal aid for flood victims. National legislation in the 1960s and early 1970s created and expanded the National Flood Insurance program. Under this program communities located on flood plains were required to develop plans for minimizing flood hazards or forfeit federal assistance in the event of a flood. Since 1903, and through a series of five floods, local government officials had investigated the flood problem and discussed building a dam. In the late 1940s the Corps studied Willow Creek upstream from Heppner and recommended a 110-foot dam at an estimated cost of \$5.5 million. Because of the marginal economic justification of this single-purpose project, Congress took no action. In the late 1950s citizens requested a second study which was subsequently funded. The Corps' 1963 report proposed a multiple-purpose dam with storage for municipal and industrial water supplies, irrigation, and recreation. Congress authorized the project on October 27, 1965.⁴³



The design memorandum studies as completed in 1973 considerably altered the original proposal. It was now a 149-foot structure; irrigation was deferred; recreational uses reduced; and water supplies eliminated. Congress approved the project in 1974, but President Ford promptly vetoed it. His reasons were strictly economic as the benefits no longer justified the costs. Nonetheless, Oregon Senator Mark Hatfield came to the defense of the Willow Creek Dam, arguing that flood control dams were justified by the lives they protected and not only by favorable benefit-cost ratios. This reasoning convinced Congress which approved the project in 1978.⁴⁴

While these activities were taking place, Heppner residents exerted their own pressure. In March 1976 after the Ford veto, all 38 of the Heppner citizens attending a public hearing spoke out against the dam. Walla Walla District Engineer Colonel Nelson Conover confided to Division Engineer Major General Wesley Peel that the local people would no longer tolerate a project repeatedly proposed and disapproved. Conover advised that the Corps do no further work until the residents supported the project. During the next few months, the Heppner Water Control District began building a system of waterways, terraces and small ponds as flood control measures. The Soil Conservation Service aided this effort by channeling runoffs away from the town, and the federal government installed flood alarms. However, the release of revised flood control studies and maps of the area in early 1978 showed Heppner occupying a flood plain. Without a flood control dam, high flood insurance rates would virtually eliminate new construction and remodeling in business and residential sections.⁴⁵

At a public meeting in February 1978, the majority voted in favor of the dam, signaling Senator Hatfield to reintroduce legislation for the project. However, other citizens in Heppner and the two downstream communities of Ione and Lexington protested. The Walla Walla District then asked the Heppner

City Council to reaffirm its support, but the Council turned the matter back to the citizens. A referendum held in March 1979 favored the dam by a 188 to 135 vote. With both Congress and local residents now in favor of the project, the Walla Walla District proceeded with designs for a roller-compacted concrete dam, the first of its type to be built in the United States.⁴⁶

Although the tangible benefits of the dam could not justify the project economically, Colonel Christopher J. Allaire, Senator Hatfield and others rightly pointed out that protection of human life was an equal consideration. Despite this argument, local acceptance of the dam resulted directly from the economic impact of high flood insurance rates for the unprotected flood plain.⁴⁷

One of the most visible roles of the Division in water resource development is flood fighting. Legislation passed in 1956 and expanded in 1962 – known as Public Law 84-99 – authorized the Corps to carry out emergency operations such as preparing for emergencies, fighting flood waters, conducting rescue work, emergency repair, and restoring flood control works either threatened or destroyed. The passage of the 1956 law coincided with abnormally deep snow pack in the Columbia River watershed, 157 percent above average in the upper Columbia. Using the authority of the new law, the Division organized a comprehensive operation, giving top priority to the development and prosecution of its new, advanced, flood fighting program. It authorized work at five locations and dispatched engineers to determine how to insure that flood control facilities could withstand the predicted flood stages. The Division inventoried flood fighting equipment, ensured that tools and materials were in good condition, alerted construction contractors, and held meetings with representatives of all levels of government. "I feel that we will be ready for any eventuality," General Louis Foote assured General Sturgis. Public information comprised an important part of these pre-flood preparations, and Foote held a press

conference April 9 on the flood threat, describing what the Division was doing to anticipate and fight the flood should it occur. Foote, sensing a "tendency toward hysteria on the part of some," gave his assurance that although the Division was prepared for any eventuality, no agencies had yet predicted a flood comparable to that of 1948. During the next month the Division completed work on 47 projects under the advanced flood fight program. The program totaled \$1,073,000 and was well distributed among the states of Oregon, Washington and Idaho.⁴⁸

Flood fights and emergency works have ranged in scale from aiding in minor periodic overflows of levees in Jackson Hole to providing help in deluges like those in the Willamette Basin in early 1974. After responding to the 1974 threat, General Richard E. McConnell praised the efforts of his field offices to the Chief: "The decentralized action on the part of the districts once again was superb." Oregon Governor Tom McCall described the Division's activities and "noteworthy" cooperation with local and state agencies in a letter to the press. "It is most gratifying to know that the Corps is close at hand, ready to render maximum assistance in a wide variety of roles."⁴⁹

CHAPTER 7. ENDNOTES

1. Howard Corning, *Willamette Landings*, pp. 49, 91, 112.
2. Holmes, *A History of Federal Water Resources Programs*, 1800–1960, pp. 4, 7–8.
3. Ibid, pp. 19–20.
4. U.S. Congress, House Document 544, “Willamette River and Tributaries, 75th Cong., 3rd sess., 1938, p. 3; Lukesh to Chief of Engineers, 21 Sept. 1929, RG 77, NA, 111, 7249/65.
5. Pacific Northwest Regional Planning Conference, “Proceedings of the Water Resources and Power Division, Dec. 12–13, 1934, Seattle,” pp. 18–22, 30, 82.
6. Ibid.
7. House Document 103, pp. 69–70; U.S. Congress, House Document 263, 72nd Cong., 1st sess., 1932, pp. 117; Wood to Martin, 6 Jan. 1934, Williams to Division Engineer, 5 Feb. 1934, RG 77, Seattle FARC, NPD 508/8, “Flood Control 1934–38; Willingham, *Army Engineers and the Development of Oregon*, p. 109.
8. Brown to Pacific Division Engineer, 17 July 1933, *ibid*, NPD 503, “General 1931–1940,” Vol. 5.
9. Williams to Division Engineer, 13 Dec. 1934, *ibid*; Snow, Chief’s Office to Gen. John C. Lee, Division Engineer, 23 May 1938 and Lee to Chief’s Office, 26 May 1938, RG 77, NA, 111, 7249/377.
10. Robins to Portland District Engineer, 7 July 1936 and endorsements of 14 and 15 July 1936; Cpt. Lucius D. Clay, Chief’s Office, 24 July 1936, *ibid*, 3064/4.
11. Snow to Division Engineer, 14 Sept. 1937 and Robins’ reply, 1 Oct. 1937, RG 77, Seattle FARC, NPD 501/22, “Flood Control 1936–1940.”
12. William G. Robbins, “The Willamette Valley Project of Oregon: A Study in the Political Economy of Water Resource Development,” *Pacific Historical Review* 47:4 (Nov. 1978), pp. 590–93, 596–97, 599; Oregon State Planning Board, *The Willamette Valley Project: A Regional Plan* (Salem, 1935), pp. 1, 4, quoted in Robbins, p. 593; Kipp to Pierce, 28 Dec. 1937, Pierce Papers, quoted in Robbins, p. 599.
13. House Document 544, pp. 47, 100, 103; Willingham, *Army Engineers and the Development of Oregon*, pp. 110–111.
14. Ibid, pp. 3–4, 8, 10.
15. Willingham, *Army Engineers and the Development of Oregon*, pp. 113, 166–69.
16. House Document 544, pp. 13–14.
17. Robbins, p. 599; Oregon State Planning Board, *Oregon Looks Ahead* (Salem; 1938), p. 63. Willingham, *Army Engineers and the Development of Oregon*, pp. 112–113.
18. House Document 544, pp. 13–14.
19. Oregon State Planning Board, *Oregon Looks Ahead*, pp. 63–64.
20. Robins to McNary, 1 Nov. 1937, McNary papers, Box 6, quoted in Robbins, p. 602; “Summary of desirable flood control projects in Oregon as recommended by the Division Engineer and described in the State Planning Consultant’s preliminary report to the National Resources Committee,” 21 April 1936, RG 77, Seattle FARC, “Flood Control, 1934–37”, Vol. 2. Descriptions of the local warning and evacuation plans can be found in the Portland District Records, Seattle FARC, 77–77–00115, “Willamette River Basin,” 154860. Willamette River Basin Commission to Walsh, 9 Dec. 1948, *ibid*, NPP 334.232; Lloyd C. Reinholdt, Chairman, Recreational 9 Division, Willamette Valley Project Committee to Portland District, ca 1947, *ibid*, NPP 800.922.
21. House Document 704, pp. 10–11, 39, 42; Cecil R. Moore, “The Lower Columbia River,” *Military Engineer*, 31:175 (Jan.–Feb. 1939), p. 23; Robins to Ninth Corps Engineer, 8 Feb. 1937, RG 77, Seattle, FARC, NPD 508/56.7, “Flood Control 1934–1938,” Vol. 1; Col. H. J. Wild, Seattle District Engineer to Division Engineer, 4 Feb. 1937, *ibid*; Sherman Green, *Seattle District History*, p. 2–12; Minutes, Fifth Annual Meeting of Puget Sound Flood Control Council, Tacoma, 21–22 April 1938, RG 77, Seattle FARC, *ibid*.
22. Snow to Division and District Engineers, 30 June 1938, *ibid*, NPD 501/38, “Flood Control 1936–1940”; Jones to Lee, 19 Dec. 1938, *ibid*, NPD 501/63.1, “General,” Vol. 2.
23. Ibid.
24. Cpt. E. E. Barnes, Division Executive Officer to Chief’s Office, 28 March 1939; *ibid*, NPD 501/26.14, “Flood Control 1936–1940,” Vol. 5; Memorandum from Edgerton, 5 Oct. 1939, *ibid*, NPD 501/56.4.5.

25. Digest of Conference in Bonneville, Oregon, 12 Dec. 1939; E.G. Debler, Bureau of Reclamation to Lee, 30 Jan. 1940; Notes of Conference at North Pacific Division, 21 May 1940; Record of Conference of Bonneville District and Bureau of Reclamation in Denver, 22–23 July 1940, *ibid*, NPD 501, "Flood Control 1936–1940," Vol. 5.
26. H. J. Andrews to Robins, 13 Aug. 1937; notice of Public Hearing, Bonneville District Engineers, 23 Aug. 1937, *ibid*, "Flood Control 1937–1940," Vols. 2 and 3 respectively; McKinley, *Uncle Sam in the Pacific Northwest*, pp. 230, 416–17, 421; Basil Manly, Federal Power Commission to Chief's Office, 19 Nov. 1935, *ibid*, NPD 512, "Power, General, 1935–1940," Vol. 2.
27. Corps of Engineers and Bureau of Reclamation, "Report on Columbia River, Flood Control Operations, 1950 Flood, August 1, 1950," Copy in Seattle District, Service Branch Files, "Upper Columbia Basin"; Willingham, *Army Engineers and the Development of Oregon*, pp. 151–158.
28. Gen. Chorpene to Gen. Sturgis, 8 Feb. 1954, Sturgis papers.
29. Sturgis to Lewis, 5 Nov. 1953, *ibid*.
30. Lewis to Sturgis, 1 Dec. 1953; Chorpene to Sturgis, 8 Feb. 1954; and Sturgis to Lewis, 24 Feb. 1954, *ibid*.
31. Howard Preston, *Walla Walla District History*, Vol. 1, pp. 81–84. (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, 1971), pp. 81–84.
32. Walla Walla District, *Upper Snake River Basin Interim Report No. 1* (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, 1962), pp. 2–11; Preston, *Walla Walla District History*, Vol. 1, pp. 95, 100, 142.
33. Minutes, Meeting on Snake River, Jackson Hole Flood Problem, 11 July 1972, Walla Walla District, Record Holding Area, NPD Program Development Files, 201–07, "Upper Snake River and Tributaries, Idaho and Wyoming", hereafter cited as Walla Walla District RHA.
34. *Ibid*.
35. Gen. Ernest Graves, Director, OCE Civil Works to Division Engineer, 7 June 1976; Gen. Charles McGinnis, Chief's Office to Division Engineer, 7 Nov. 1977 and 22 Nov. 1978; and, Gen. Richard Wells, Division Engineer to Chief's Office, 9 Jan. 1979, *ibid*.
36. Gen. Foote, Division Engineer to Sturgis, 6 Jan. and 13 Feb. 1956, Sturgis Papers; Willingham, *Army Engineers and the Development of Oregon*, p. 173; Oliver Johnson and Clarence Pedersen, "High Water in the Far West," *Military Engineer*, 57:376 (March–April 1965), p. 79.
37. Simpson to Page, 6 June 1956, Sturgis papers.
38. Gen. R. E. McConnell, Division Engineer to Gen. Gribble, Chief, 31 July 1974, NPD Quarterly Reports. ARCE 1969, pp. 4–6. North Pacific Division After-Action Report *Operation Foresight Spring 1969* (Jul 69) p 13. *Reservoir Control Center Guidance Memorandum* (Portland: U.S. Army Corps of Engineers, North Pacific Division, Jan. 1972), pp. 39, 40, 50–51.
39. Gen. Roy S. Kelley to Gen. William Cassidy, 2 May 1969; Kelly to Gen. F. J. Clarke, 1 August 1969, NPD Quarterly Reports.
40. Minutes of Briefing with John B. Roose, 22 May 1967, NPD, RHA, "Executive Office Files."
41. Briefing notes for Gen. Groves, Chief's Office, 11 Oct. 1969, *ibid*.
42. Interview with Gen. Wells, Dec. 1981.
43. Ellis L. Armstrong, ed., *History of Public Works in the United States, 1776–1976* (Chicago: American Public Works Association, 1976), p. 249; Heppner *Gazette-Times*, 15 April 1976, 16 Nov. 1978; Robert Gardner, *Social Impact Study of the Proposed Willow Creek Flood Control Project* (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, 1973), p. 17; Preston, *Walla Walla District History*, Vol. 1, pp. 109–110; ARCE 1974, p. 39–18. Information on Willow Creek from Jameson, Petersen and Reed, *Walla Walla District History*, Vol. 3, pp. 33–40.
44. 1974 ARCE, p. 39–5; Preston, *Walla Walla District History*, Vol. 2, pp. 33–34. Heppner *Gazette-Times*, 17 Aug. 1978, 5 and 19 Oct. 1978. Walla Walla District strongly encouraged Hatfield to consider loss of life as well as economics. See Col. Conover to Division Engineer, 10 Nov. 1975, Walla Walla District Engineering Files, 1518–01, "Willow Creek, Oregon."
45. Heppner *Gazette-Times*, 25 March 1976 and 2 and 9 Feb. 1978; Walla Walla District *News Release*, 2 April 1976 and 5 Dec. 1977; Pendleton *East Oregonian*, 24 Jan. 1978.
46. Gerald Roediger to Walla Walla District Engineering Division, 17 Feb. 1978, Engineering Division Files, 1518–01, "Willow Creek, Oregon", Gerald Eyestone to Mayor Jerry Sweeney, report of telephone call made after 15 Feb. 1979, *ibid*; Heppner *Gazette-Times*, 15 and 22 March and 5 April 1979.
47. Heppner *Gazette-Times*, 19 Oct. 1978; Col. Allaire to Division Engineer, 4 May 1979, Walla Walla District Engineering Division Files, 1518–01, "Willow Creek, Oregon."

48. Foote to Sturgis, 10 April and 3 May 1956, NPD Quarterly Reports.
49. McConnell to Gribble, 25 Jan. and 23 April 1974, NPD Quarterly Reports.

VIII

THE WAR YEARS:

CONSTRUCTION AND POWER FOR DEFENSE



All of the power now being generated by the Grand Coulee and Bonneville projects is being utilized . . . There is a dearth of power in that area at the present time. It is true that war activities are taking the bulk of the power now generated. It is also true that in the post-war period the utilization of our natural resources and reclamation of our farming areas in order to provide employment for our returning soldiers and laborers released from war activities, it will be necessary to keep these projects working. This will require electric energy.

Homer Angell, Oregon Representative,
Hearings before the Committee on Rivers and Harbors,
October 1943



Fort Stevens, ca. 1897.

1. Introduction

World War II affected the North Pacific Division in several important ways, some temporary and others permanent. The workload abruptly shifted from civilian projects to military construction and supply while the Division itself was merged with the South Pacific and Mountain Divisions into a Pacific Division with headquarters in Salt Lake City. This merger was a result of the War Department's transfer of these functions from the Army Air Corps and the Quartermaster Corps to the Corps of Engineers. When the Corps re-established the North Pacific Division in Portland after the war, the growth of industry and population in the Pacific Northwest had radically altered the demands and justification for hydropower in the region. The power markets which Colonel Robins in the 1930s cautioned were decades away, had now arrived.

The war in the Pacific and the threat of invasion from Japan also demonstrated the strategic importance of Alaska and the Aleutian Islands. The defense work in that territory continued after the war, becoming a national priority during the Korean conflict and the ensuing cold war. Because of new hydropower projects and construction of the Alaskan defense and warning systems, the Corps established two new districts, Alaska in 1946 and Walla Walla in 1948. With new organizational capability to meet the needs of the Pacific Northwest in military defense and hydropower, the North Pacific Division entered the modern age.

2. Prelude to war

The Army and the Corps of Engineers have been involved in the defense of the Northwest Coast since the early 19th century. The Army built posts and stockades on the Columbia to protect American interest first against the British and then the Indians. During the Civil War, the Army built modest forts at entrances to Puget Sound and the Columbia, but these soon fell into decay. The Army Engineers later repaired them and built new ones at the time of the Spanish American War. Although there was little military activity in the Pacific Northwest during the First World War, the Columbia and Puget Sound forts served as active coastal defense installations until World War II.¹

While opinion in the United States fluctuated on the strategic importance of Alaska during these decades, the Army and other federal agencies played a major role in its transportation and communications systems. The Army directly occupied the region from 1867 to 1877; then it returned in 1900 to maintain order during the Yukon and Nome gold rushes. In the 1920s the Army again withdrew except for a small force at Fort Seward. Other federal agencies invested in Alaska. The Signal Corps built a cable and telegraph system and Corps officers helped construct military trails in the early 1900s through the inter-agency Alaska Road Commission. In 1923 government crews completed the first railway line from Fairbanks to Anchorage and Seward. Air transport and an air defense system came later. The first mail service began in 1927, but there were no regular commercial flights from the lower states until the mid-1930s.²

Foremost among the few who recognized Alaska's strategic importance was Brigadier General William (Billy) Mitchell. He warned Congress of the growing threat from Japan, predicting an offensive strike at that territory. Until the late 1930s however, Alaska defenses relied on naval protection



Fort Stevens battery and plant at the mouth of the Columbia, ca. 1897.

even though there were only three small naval bases there. Moreover, the Army's military presence was limited to one installation at Fort Seward.³

The Corps' role in Alaska also fluctuated. In 1913 it formed a separate Juneau District, but disbanded it in 1923 after a nine-year trial period. The Seattle District then took over the few civilian projects in Alaska Territory. By 1938 the Corps had no organization or military projects there, but the increasing threat of war and military build up in Japan prodded Congress into releasing funds for new naval and air bases. Because of this quickening defense activity, the Corps created an Area Office in Anchorage in 1939 to handle military construction with Seattle District administering the first military construction of airfields and aircraft detection sites. The Corps also surveyed sites for new airfields in the panhandle. In 1941 the Alaska Area Engineer took over supervision of military work from the Seattle District.⁴

Although Congress and the Administration recognized the need for military defense of Alaska and the Pacific Northwest in 1940, a bureaucratic struggle ensued as to which agency would be in charge of the construction program. The situation was critical for the Corps because civil appropriations dropped dramatically in 1939 and 1940. In the spring of 1940, President Roosevelt announced several reductions in all public works programs and declared his opposition to new construction not needed urgently for defense.

Although there was a backlog of projects and a current appropriation of \$172,800,000, there were few new projects planned for the Corps. Chief of Engineers General Schley feared that the diminished civil workload would result in drastic cuts in personnel. Although officers would find new assignments in the expanding military functions, the civilian organization might be crippled. In addition, Schley faced efforts within the Army to form a separate construction branch. Fortunately, the Corps had substantial support in

Congress, the War Department, and the construction industry thanks to its prestigious construction record and its decentralized structure. Unlike the Quartermaster Corps, the field offices of the Army Corps of Engineers did not have to refer all decisions to a head office for approval. In late 1940, Congress approved transferring Air Corps' construction to the Corps of Engineers, and a year later in October 1941, Congress and President Roosevelt authorized the Corps to take over all remaining construction from the Quartermaster Corps.⁵

World War II ushered in a period of intense activity in the western states and in the Division. In January 1941, the Division merged the Bonneville District into the Portland District in order to centralize scarce engineering skills to meet the increasing workload. A major obstacle for defense work was congested communications lines. The Division had to wait for orders mailed from Washington, D.C. Because of the need to construct air fields in the shortest possible time, these delays became critical. In January 1942, Colonel Richard Park applied for and received expanded authority in purchasing and other operations during this national emergency. The Division's workload increased dramatically. At the peak of operations in August 1942, the three western divisions - North Pacific, South Pacific and Mountain - employed 120,000 people and during the first six months of 1942 were expending an estimated \$3 million a day. This rapid build up led to a reorganization of the western divisions. On November 21, 1942, the Corps established a new Pacific Division with headquarters at Salt Lake City, incorporating the former three divisions. The Corps also set up a branch office in San Francisco to handle procurement and civil works and also to work closely with the Western Defense Command on coastal defense construction. With the appointment of General Warren T. Hannum as Pacific Division Engineer, the Corps transferred Colonel Park to Seattle to serve as District Engineer. This wartime consolidation remained in effect until March 5, 1946, when the Chief re-established the North Pacific Division with headquarters in Portland.⁶

3. The Pacific Northwest at War: the Seattle and Portland Districts

During the war years, the districts became military organizations in essence. Civilian engineers received Army commissions, and engineering activities concentrated on building training camps, air bases, defense installations and logistic facilities. River and harbor work slowed or was postponed except for defense-related work on hydroelectric and navigation projects. After the attack on Pearl Harbor, the Corps' first priority was expediting shipping by overseeing loading and scheduling of military shipments. The threat of a Japanese invasion and attack affected the pace and also the type of defense projects within the region, ranging from protective revetments for military planes to gun installations at batteries at the mouth of the Columbia, Puget Sound and other coastal harbors. The Corps built radar facilities and watchtowers along the Oregon Coast and camps for the beach patrols which supplemented the radar installations. The actual Japanese occupation of the outer Aleutians in the summer of 1942 increased coastal defense preparations for what was believed to be an imminent threat of invasion.⁷

Because of the concentration of military activity in Alaska during the first part of the war, the Seattle District experienced

acute supply problems. From 1941 through 1943, when the supply organization reached its peak, the district shipped an estimated 1.5 million tons of material worth over \$131 million. In the Portland area, the Portland District was responsible for alleviating congestion at railroad terminals and transfer points by increasing the amount of track and constructing new warehouses. The pace and scope of these wartime activities produced unique situations. An eyewitness to these events captured the flavor and intensity of the military scene: lend-lease planes with red stars added to their olive drab departing from the Great Falls, Montana air base en route to Russia; hundreds of bomber crews training on the two-mile-long runways of Moses Lake airfields; streams of "freight cars bearing burdens addressed to cryptic coded destinations" shuttling along the 41 miles of trackage; and at the Seattle Port of Embarkation vast transit sheds and piers, troops and combat supplies flowing aboard ships destined for European and Pacific theaters.⁸

Corps personnel accomplished a prodigious amount of work by putting in long hours and often working weekends and holidays. Despite this effort, the districts suffered a constant shortage of trained personnel and offices submitted innumerable requests for travel authorities to recruit trained people, especially for Alaska. The drafting of men into the armed forces and competition with local industries, particularly aircraft, aluminum and ship building plants, sharply reduced the ranks of available labor. These industries offered higher salaries and better benefits. Some relief came with the War Manpower Commission and a presidential order freezing wages. However, wage freezes complicated recruitment for more isolated, hazardous and less attractive areas like Alaska where high wages were the sole inducement for most workers. Beginning in 1942, the Seattle District sent out recruiting teams to help insure that a new recruit would not be attracted to a rival organization offering better wages and working conditions. Worker desertion was a particular problem for those stopping over in Seattle on their way to Alaska. The Seattle District countered this by drawing up contracts, providing escorts, and restricting liberty during layovers. It even built a transient labor camp in Seattle with abundant good food and entertainment. The districts handled shortages of engineers and other specialists by contracting out design field surveying and actual construction work. This proved to be a successful arrangement.⁹

Wartime conditions also meant improvisation. In the Seattle District where shipbuilding was a major industry, engineers had to substitute wood for scarce steel whenever possible, and German prisoners of war from Rommel's North African Corps traveled daily from their camp at Fort Lewis to work in the Argo railroad yard.¹⁰

Camouflage of air bases, a relatively new area in defense, was another wartime innovation. Personnel educated in the tradition of Army spit and polish had to be retrained. At the small airfield at Port Townsend, for example, a visiting officer complained to Seattle District Engineer Colonel Beverly Dunn that crews had dressed up the airfield with bright paint on fence posts and sheds. They also had diligently cleared the underbrush around the airport, making the field easily visible from the air. The officer recommended discouraging these practices and retaining the abandoned appearance of the field. The Engineers introduced experimental camouflage work at Fort Worden in 1940 that replaced standard techniques of camouflage paint and vegetation in favor of overhead nets, vegetation garlands, and clever use of color. The Seattle



Japanese bombing of the Dutch Harbor Naval base, 4:30 pm June 4, 1942.



Camouflage of the Seattle Boeing Plant.

District supervised more sophisticated engineering projects on larger installations like Boeing field in Seattle and Bonneville Dam. The concealment devices were so successful that American pilots had difficulty finding the landing strips. The Corps also designed and constructed new seacoast defenses. In this era of advancing technology, however, there were few employees who understood the principles, let alone the capabilities, of modern weapons.¹¹

One of the most notable achievements of the Seattle District during the war was its assistance in building the Hanford nuclear energy plant near the Columbia River in eastern Washington. The Hanford works were part of the Government's secret investigations of uranium and plutonium leading to the development of the atomic bomb. The District participated in several phases of the Manhattan Project, including investigation of the site and providing design assistance based on its experience in testing and constructing river intakes, cooling basins, effluent discharge and fish screens. The Government had located the plant in this

sparsely populated desert area because the environmental effects of the process were still unknown. Seattle's task of inspecting and monitoring the programs was an essential part of the Hanford project. In February 1943, the Corps began condemnation proceedings to acquire 200,000 acres, an amount that later was increased to 440,000. Because of the strict secrecy surrounding the project, even the new Seattle District Engineer, Colonel Conrad P. Hardy, was denied a request to obtain information on activities there. By enforcing elaborate security measures, the Army preserved the secrecy of the Manhattan Project throughout the two and one-half years of construction. This occurred in spite of the fact that the total labor force numbered 137,000, many of whom commuted from nearby towns and farms.¹²

4. The War Effort in Alaska

The Corps' military program in Alaska differed considerably from that in the other Pacific Northwest states because of the Japanese invasion and occupation of the Aleutian islands Attu and Kiska in June 1942. Alaska also occupied a strategic position in relation to the Soviet Union and to air routes to Asia. Because of Alaska's lack of development, the Corps' military construction work necessarily included building roads and communications networks as a part of the defense plan. This defense work which brought people, new roads and industries into Alaska, stimulated a substantial and fundamental development that would not have been possible under normal conditions in the same brief time span.

Before and during World War II, the organization of Corps activities in Alaska Territory was somewhat complicated. Construction, previously handled by the Seattle District, was transferred to the Western Defense Command in 1942. In 1943 it was transferred to the Alaska Department when Alaska was designated a separate war theater. Administration of military construction which had been carried out under a split command of the Area Engineer and the Alaska Garrison was now consolidated under the Alaska Department. However, the Seattle District retained control of supplies and shipping even

Camp for the Alaska Highway Construction Crew, 1942.



after the formation of a separate Alaska District as part of the North Pacific Division in 1946.¹³

Remoteness and extreme weather conditions created unique problems of keeping workers and soldiers warm and devising innovative methods for building on muskeg and permafrost. General Benjamin B. Talley, the first commander of the Alaska Engineer Office, remembers that during the battle of Attu, soldiers were sent to Alaska equipped with leather logging boots. After wading ashore through the surf, the men climbed a mountain in freezing temperatures in their stocking feet because their feet were swollen and their boots had shrunk. Four or five days later suffering from frostbite, they managed to crawl back to the camp.¹⁴

Alaskan geography created other difficulties for construction and defense work. Along the Aleutian Islands and other coastal harbors, transports could not directly load and unload their cargoes. Crews had to either transfer loads to smaller ships or float supplies and equipment ashore. In the absence of a supply fleet or transport planes, the Seattle District had to rely on dredges, snag boats and other small craft to get supplies into the interior. At one time, the District used an old schooner as a barge and even pressed into service an old steam pleasure yacht. According to General Talley, all travel to Alaska at that time was by steamer, and when Pearl Harbor was bombed, there were only 30 fighter planes in the entire Territory. By the time of the battle of Attu, however, there were 2,200 aircraft.¹⁵

The rapid pace of construction activities in Alaska – building new air bases, a new road linking Alaska to the Continental United States (ALCAN), and the oil pipeline from just below the Arctic Circle to Whitehorse (CANOL) – necessitated finding quick solutions to the problems of building on permafrost (permanently frozen ground). The surface layer covering the frozen soil thaws in summer and freezes in winter. This action causes settling of the layer during thaws and heaving during cold weather resulting in various combinations of sliding, shrinking and cracking of the top layer. Removal of vegetation and the insulating layer during construction exposes the frozen layers underneath to thawing and sinking.

Therefore, as the engineers quickly learned, these sections have to be filled immediately with excavated material or material that is not subject to frost heaves. Because of the unusual and unknown nature of this soil, the Corps undertook special investigations through its research laboratories in the St. Paul Engineer District and on-site in Alaska.¹⁶

The construction of a highway from the United States through Canada and into Alaska epitomized the close relationship between military and civilian works in that region. This highway, ALCAN (Alaska–Canada), would be the first direct land route connecting the two parts of the United States. Surveys for a route had been authorized in 1935, but final approval and funding lagged partly because of a squabble over the location of the highway and because of its low priority among other construction projects in the prewar years. In 1940, the Alaskan International Highway Commission, headed by Washington Representative Warren G. Magnuson, relied on the economic arguments of increased tourism and access to mineral deposits instead of national defense in its report to President Roosevelt. Even the War Department was skeptical about the need for a highway, reporting in early 1941 that the road might be useful as a long-range defense measure, but justifiable only under low priority.¹⁷

The bombing attack on Pearl Harbor changed the ALCAN project to one of military necessity. By February 1942, the War Department had produced plans for a road and recommended using Engineer troops to avoid delays with civilian contractors. The plan was authorized and initiated on February 14. Because of the inaccessibility of the route, the work was divided into sections, and equipment and crews moved slowly into position. The Corps decided to build a pioneer road instead of a regulation highway, but during the construction, the demand for supplies for the working parties and the threat from the Japanese landings on Attu and Kiska convinced the War Department to alter the plans and construct a surfaced road. Reconnaissance crews in aircraft and ground surveying parties traveling by foot, dog sled, horse, or on tractor-drawn trailers preceded the construction workers. Because of the lack of topographical information on much of the terrain, these surveying parties kept just ahead of the work

crews. Despite these conditions and the problems of building on swampy or partially thawed soil with permafrost below, the road was completed – almost miraculously – on November 20, 1942, only 8 months after it was begun. The completed road of 1,450 miles stretched from Dawson Creek, British Columbia to Big Delta near a railhead southeast of Fairbanks. Later extended to 1,671 miles, the highway became the Alaskan state highway.¹⁸

The second military project related to transport needs was CANOL (Canadian Oil Line), a pipeline system for bringing oil from wells on the McKenzie River just below the Arctic Circle in Alberta to southeastern Alaska, and connecting with the ALCAN highway. The purpose in building the pipeline was to provide a reliable source of fuel for airplanes along the Northwest staging route and for trucks using the ALCAN Highway. When the project was initiated in spring 1942, Japanese forces were threatening the Aleutian Islands. Consequently, the Army accelerated the work, and it planned to increase oil production from 800 barrels to 3,000 barrels a day at the oil field and to construct a pipeline and refinery at Whitehorse in the Yukon Territory. The Corps constructed a total of four pipelines, but the withdrawal of the Japanese in 1943 ended the direct threat to the United States, and only one line from Skagway to Whitehorse was kept in operation. However, the United States government remained interested in the prospect of oil exploration in Alaska. In May of 1944, President Roosevelt approved a supplemental estimate of an appropriation of \$1,217,000 for joint exploration for oil by the Corps and the Interior Department. Realizing the importance of oil for defense, the government listed self-sufficiency in oil as an important justification for the appropriation request.¹⁹

A third project affected by the changing military conditions was a survey for a trans-Canadian, Alaska and Western Railway. The Seattle District supervised the survey begun in 1942 and carried out by the Anchorage Area Office. The survey included a pipeline and harbor facilities at Port Clarence to aid in transporting cargoes to the Soviet Union. With the easing of war emergencies in the European and Pacific theaters in 1943, the War Department discontinued the project.²⁰

5. World War II: Power and Navigation for Defense

While the war abruptly interrupted the North Pacific Division's civil works program, it also stimulated power and navigation development as part of the industrial response to the war effort. Industrial and resource planning groups like the Pacific Northwest Regional Planning Commission initiated investigations on the future industrial development of the Pacific Northwest. The Northwest Regional Council, a non-profit group formed in 1938, declared in 1940, "The time is ripe for the Pacific Northwest to cast aside the swaddling clothes of a colonial economy and enter the industrial age." It noted that the electrochemical and metallurgical industries that produced crucial war materials of aluminum, magnesium, manganese, chromium and tungsten required large quantities of electricity. In addition, they offered the best possibilities for industrial growth. In 1940, the Aluminum Company of America (ALCOA) constructed a \$3.5 million plant at Vancouver and negotiated a 20-year contract with Bonneville Power Administration for 65,000 kilowatts; the Pacific Carbide and Alloys Company was scheduled to be built at Portland.²¹

The Northwest Regional Council pointed to high transportation costs as one factor hindering industrial development because of the distance of regional resources and plants from national markets. Before the war, the high rates had motivated businessmen, farmers and residents in the Inland Northwest to lobby for the Umatilla and the lower Snake River dams. With completion of Bonneville in the late 1930s, channel improvements upstream, and construction of port facilities at The Dalles, navigation opportunities increased considerably on the middle Columbia. Although Bonneville District Engineer Major Theron D. Weaver in 1939 did not cite defense as benefiting from these navigation improvements, he optimistically noted that rebirth of waterborne commerce on the Columbia was bringing "new life and new hope" to the area. However, the future of navigation on the middle Columbia River up to Lewiston still depended on the completion of the Snake River Project.²²

The connection between navigation and defense emerged at hearings before the House Committee on Rivers and Harbors held September 22, 1941. General Thomas Robins, former Division Engineer and now the head of the Civil Works Division in the Chief's Office, testified that the Umatilla and Snake River dams would benefit defense. He argued that with the location of ordnance depots and munitions storage at Hermiston, Oregon, near Umatilla, munitions and powder could be transported easily to ports at the mouth of the Columbia by barge. Even the airfields at Walla Walla, Spokane, Pendleton and Boise would benefit. Oregon Representative Homer Angell added that the large mineral deposits could be barged down the river to defense plants, a plan with which Robins agreed. Robins claimed that the proposed dams would not be vulnerable to enemy attack as they would be 300 miles inland and behind two mountain ranges. In addition, the difficult terrain and deep canyons of the Snake River would make an air attack difficult. As for the possibility of blowing up a dam, Robins pointed out that this would take a long time and use "an enormous amount of explosive. You would practically have to take it apart piece by piece."²³

Despite the continuing interest in navigation, power was the dominant issue in the Pacific Northwest. The defense industries pushed for completion of power generating facilities at Bonneville and Grand Coulee to feed aluminum and other defense plants. By 1943, Bonneville was delivering full generating capacity of 514,000 kilowatts. In planning and coordinating power needs of the Pacific Northwest during World War II, the Bonneville Power Administration emerged as a major federal agency. It compiled surveys on industrial sites from Astoria to The Dalles in 1940, and in 1942 and 1943 it completed additional studies on plant sites in other favorable locations in Oregon and Washington, including the mid-Columbia Basin, Puget Sound, Grays Harbor, the Willamette Valley, and the Oregon Coast. Other studies concentrated on defense industries, giving consideration to diversified industrial development that could be used after the war. The aluminum industry became a major buyer of electricity. In March 1943, BPA was selling 500 million kilowatt hours out of a total of 830 million to aluminum plants. As part of the development of its power network, the BPA oversaw the construction of transmission lines and integration of power from the several public and private hydroelectric projects into one system known as the Northwest Power Pool. Although hydroelectric production expanded rapidly under the accelerated construction program at Bonneville and Grand Coulee dams, it only

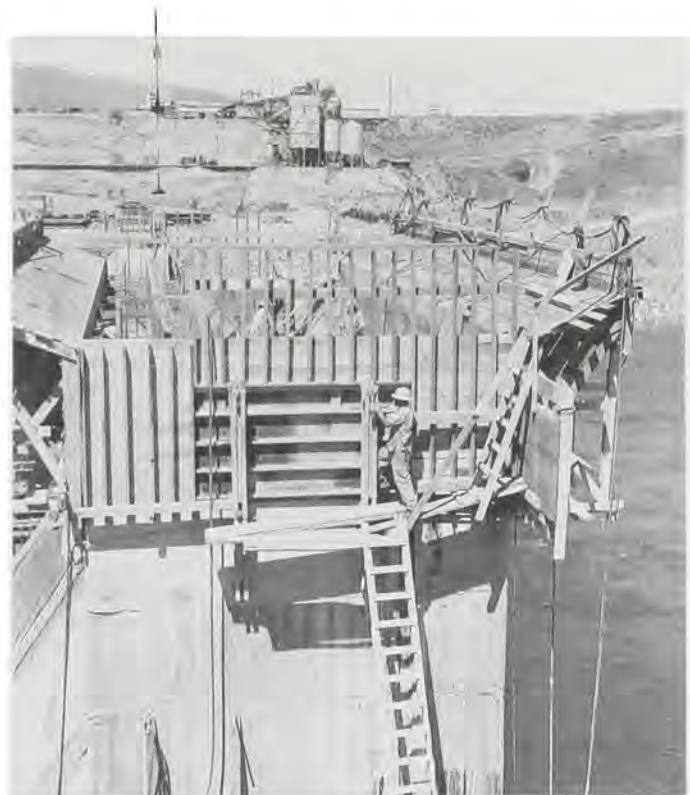
Powerhouse and intake structure at Chief Joseph Dam, 1954.



partially fulfilled the BPA's recommendations. The War Production Board's Office of Production Management gave top priority only to the first six generators at Grand Coulee and rescinded a top priority rating for transmission lines to defense plants in the Spokane area.²⁴

The Division's survey at Foster Creek on the upper Columbia and subsequent construction of Chief Joseph Dam as a power project in the late 1940s represented many conflicting issues in hydropower development that surfaced during the war years. Along with the issue of war and post-war needs for hydroelectricity were questions of which projects would be built and who would build them. In the case of Foster Creek and Chief Joseph Dam, the Bureau of Reclamation made an unsuccessful effort to have the project removed from the 1946 omnibus Rivers and Harbors Bill and assigned to itself as an irrigation project. The Division was fully aware of the implications of the interagency struggle for projects. In a 1941 report on navigation and power surveys on the upper Snake River Basin, Portland District Engineer Colonel Cecil Moore advised Division Engineer Colonel Richard Park that "with the great interest now being shown in the development of power in the Northwest, I believe that these investigations should be undertaken by the Engineer Department without delay." Park emphatically agreed, "in view of the aggressive action by other agencies toward taking over such investigations in the area . . ." The Chief's Office approved the request for the survey.²⁵

Colonel Park addressed this issue again in March 1942. He pointed out to the Chief that the Division had completed basic plans for all the projects on the main stem of the Columbia as well as minor hydroelectric installations on existing irrigation and flood control dams. He foresaw the possibilities of producing vast quantities of power on tributaries where projects could advantageously combine power and storage benefits. Park noted that plans for power development on these tributaries had not been well developed although they were definitely part of a comprehensive plan for power production. Other projects needed further investigation before construction priorities could be established on a long-term basis. Although additional plans would not be needed for



Construction of spillway of Chief Joseph Dam on the Upper Columbia. Authorized in 1946 and completed in 1958.

several years, he advised continuing the work on a comprehensive plan. As soon as personnel could be spared from other urgent tasks, a clear report and a program of investigations should be prepared. It was essential to protect the Division's position:

This procedure is considered advisable in order that the Corps of Engineers may retain leadership and control in the

field of hydroelectric power and water resources planning in the Pacific Northwest where this subject is one of outstanding importance and where the control of it will likely, therefore, be sought by other agencies.

He warned that the Corps could retain its leadership in the region "only by taking a very aggressive part in the broad planning for future development of hydroelectric power."²⁶

The Chief's Office recommended that Park's proposal be initiated and completed as soon as possible, after ensuring that investigations would not interfere with the war effort. The question now was how to fund the plan. The Board of Engineers for Rivers and Harbors advised that it would probably be appropriate to charge the survey against flood control, and added, "we may be able to make as much money available as the Division can use during the next year . . ."²⁷ Colonel Park's proposal was later absorbed into a comprehensive survey and report of the Columbia River and tributaries under the "308" authority. The comprehensive review, delayed because of work and transfer of Division headquarters to Salt Lake City, was completed in 1948.

With the favorable change in the military situation in 1943, the Pacific Northwest reevaluated its power needs and facilities. In February of that year the War Production Board requested the Bonneville Power Administration to investigate potential sources of electrical energy that could be developed inexpensively in case of a prolonged war effort. Based on this study, the BPA staff predicted a power shortage by 1944 or at least by 1945. It advised adding 120,000 kilowatts to the total regional generating capacity by fall 1944; and if the war continued, another 300,000 to 400,000 should be added the following year. To meet these recommendations, the Bonneville Advisory Board proposed installing the last three generators at Grand Coulee, constructing Detroit Dam in the Willamette Valley and Umatilla Dam on the Columbia and developing at least three million acre feet of storage on the Clark Fork, a Montana tributary of the Columbia. As part of this construction project, the BPA requested that it be granted authority to build the transmission facilities.²⁸

Anticipating increased power needs after the war, the Corps also began planning in 1943 for new construction projects. The Senate resolution for a comprehensive review of the Columbia and tributaries reinforced the Corps' determination to maintain its prominent role in water resource development. Although it was impossible to increase the Division's work force for the survey under wartime priorities, the Chief's Office directed the Division (in its temporary form as the amalgamated Pacific Division) to pursue the surveys as part of its post-war planning and construction activities. It believed that carrying out the investigations would place the Division in an advantageous position for new construction projects when the war was over. Because of war-time priorities, the Chief's Office directed the non-military field investigations be kept at the minimum level necessary to insure the War Department's position of leadership in the Northwest and to lay the basis for an expanded survey program following the war.²⁹

Although in the 1940s most plans to increase power and storage were not controversial, the Division's proposal to manipulate the level of water in Montana's Flathead Lake with a dam on the Clark Fork produced a storm of unified protest from the local communities. At public hearings held in June 1943 in western Montana, Pacific Division Engineer General Hannum, Colonel Park and Paul Raver, Bonneville Power

Administrator, patiently listened to the vociferous opposition from citizens and local officials. Impressed with the arguments that the dam would cause social and economic damage, they immediately withdrew the proposal and promised to consider other sites, including Hungry Horse in the upper Flathead Basin. At a subsequent public hearing before the House Subcommittee on Irrigation and Reclamation, Governor Sam Ford of Montana declared that his state would not permit any alteration to Flathead Lake, but he urged construction of the Hungry Horse Dam for domestic water supply, irrigation and power. Congress subsequently authorized the dam as a Bureau of Reclamation Project, but the hearing had demonstrated how the public could influence the decision making process within the Federal Government, especially in new areas of social concerns. One of the major complaints was that the Corps had not consulted local residents on the project. When the Corps dropped the proposal, Montana citizens formed a group that campaigned for the Hungry Horse Dam, demonstrating that they were not against development as such, but objected to the manner in which decisions were reached.³⁰

The hearings also inspired the region's governors to create the Northwest States Development Association, for the purpose of developing a plan for the entire Columbia River Basin. With assistance of experts from the five states of Idaho, Montana, Oregon, Washington and Wyoming and Federal agencies, that body produced a report in December 1943 which stressed state sovereignty and the leading role of states in water resources development. The Development Association suggested establishing a compact commission to prepare a long-term plan. The completed plan endorsed the earlier proposals by Paul Raver that included Hungry Horse, storage dams at Cabinet Gorge and Albeni Falls in northern Idaho, Umatilla, and the lower Snake River dams. Tying all these projects together would be a transmission system estimated to cost \$100 million. Although the Northwest States Development Association failed to overcome problems of state particularism, gubernatorial changes, and indifference, it did bring to light the need for state cooperation in regional planning, a need that became more acute when Congress dissolved the National Resources Planning Board and its regional branches in June 1943.³¹

In order to compensate for the elimination of the National Resources Planning Board which Congress decreed could not be reinstituted under any form, President Roosevelt issued an executive order in October 1943 requiring construction agencies to prepare and keep up-to-date, carefully planned and realistic long-range programs that would be submitted annually to the Bureau of the Budget. With this measure, Roosevelt preserved and encouraged long-range planning and interagency cooperation. Another measure designed to fill the gap in national planning was the creation of the Federal Inter-Agency River Basins Commission based on the earlier tripartite interagency agreement of 1939 among the Departments of War, Agricultural and Interior. The FIARBC, or the less cumbersome and popular nickname "Firebrick," included a fourth agency, the Federal Power Commission. In December 1943, "Firebrick" announced a series of monthly conferences on multiple use projects and encouraged cooperation at the field level to avoid duplication of effort, increase the exchange of data, and promote concurrent submission of reports. It was not authorized to make binding agreements. In 1946 "Firebrick" was replaced by the Columbia Basin Inter-Agency Committee.³²

Post-war planning in the Pacific Northwest focused on continuing the prosperity of industrial plants built to produce war materials. Much of the region's industrial development and population increases were directly tied to the defense industries, particularly to the large aluminum, shipbuilding and aircraft plants. This concern influenced decisions on the Umatilla Dam and lower Snake River projects. At a House hearing in 1943, Representative Homer D. Angell argued the need to continue operating the plants with the cheap electricity now available from the Columbia dams. He pointed to the fact that all the power presently produced was being used and that channeling this abundant and cheap electricity into peacetime uses would help insure the employment of war veterans and defense workers. As for Umatilla Dam, Angell reminded the committee members that the Division's previous report found that the project would be justified when power could be sold. A representative of the Chief's Office affirmed that all power from Grand Coulee and Bonneville was being utilized and navigation was reviving. Presenting data from the Portland Traffic Association, Angell claimed that the creation of slack water above Bonneville Dam had substantially increased water commerce and lowered railroad rates. Angell also presented to the committee a telegram from Bonneville Power Administrator Paul Raver supporting Umatilla Dam as the next logical step in the post-war development because of its strategic location in the northwest power grid and the existence of heavy industries in the middle Columbia area. Raver did not overlook navigation. He placed this benefit along with hydropower as mutually supportive. In the next Rivers and Harbors omnibus bill Congress moved a half step toward final approval of Umatilla, but not the Snake River project. It did agree to consider the latter once more in early 1944.³³

Power planning in the Pacific Northwest did not enjoy a consensus. Despite combined efforts of the Bonneville Power Administration, Congressional delegations, and the Division to convince the Federal Government it should prepare for steady growth within the region, in 1944 the War Productions Board recommended cutbacks in aluminum production. With BPA's assistance, a committee of businessmen and public officials succeeded in reducing the cuts to 25 percent. In early 1945, the Board reversed its earlier position and reopened all the pot lines. The sudden revival of the aluminum industry in 1945, after defense production had slowed in 1944, proved that BPA's Paul Raver predictions and the Division's optimism about the future of industrial development in the Pacific Northwest were correct. The boom in industrial production which reopened pot lines and rolling mills was also a result of high prices for steel products and lumber which made mass-produced aluminum competitive with these types of building materials.³⁴

Proponents of the Columbia and lower Snake dams continued applying pressure on Congress. In 1944 another hearing was held before the House Committee on Rivers and Harbors. With the end of World War II approaching, the chairman of the Committee on Irrigation and Reclamation, Representative Compton I. White of Idaho, stated that the future of the Pacific Northwest had been demonstrated in its vast contribution to the war effort despite its very limited industrial development. Pointing to the immense regional resources, White declared 1946 as the dawn of the Pacific era and noted that northwestern seaports and airports were closest to Alaska and the Orient. "This proposed development of the region's resources," White affirmed, "is not an extravagance

but an economy . . ." White also foresaw the cooperation between the Corps and the Bureau in a post-war construction program and the advantages of increased commerce with Asian and South Pacific countries. White's claim that the war had also demonstrated the importance of shipping, with an increase in barge traffic relieving the strain on railroads, delighted the Inland Waterways Association. "At the present time," Waterways Association member Charles Baker testified, "we have the satisfaction of seeing the river being used to the maximum capacity." J. W. Shepard, vice-president and manager of the Lewiston Grain Growers, stated that he had 300,000 to 400,000 tons of grain that had been ordered out, but no railroad cars were available. The completion of the Lewis and Clark highway to western Montana, Shepard added, would open up a grain shipping area from Missoula requiring cheap barge transportation down the Snake and Columbia.³⁵

At the end of the 1944 hearings, Congress approved authorization for Umatilla Dam (officially renamed for Oregon Senator Charles McNary) and the lower Snake River project which would consist of "the construction of such dams as are necessary and open channel improvements for slack water and irrigation according to the plans in House Document 704." The Bonneville Power Administration was authorized as the marketing agent. In early summer of that year, Congress authorized Foster Creek Dam, renamed Chief Joseph, to be constructed by the Corps and connected with BPA's grid and marketing systems.³⁶

In retrospect, the work of the Corps in the Pacific Northwest during World War II exemplified the best in engineering innovation and organization. At the end of the conflict, Chief of Engineers, General Eugene Reybold remarked that "the secret of the remarkable performance lay in the rapid conversion of the rivers and harbors organization from peace to war, the consolidation of all military construction under one agency, and the skilled efficiency of the Army-industry building team." Toward the end of the war in 1944, the headquarter's of the Pacific Division (comprising the South and North Pacific Divisions) moved to San Francisco. Finally in March 1946, as a result of newly authorized construction and the impending review report, the War Department reconstituted the North Pacific Division with offices in Portland. Colonel Theron Weaver, former head of Bonneville District, assumed command. Military defense work continued in Alaska with the transfer of military functions from the Alaska Department to a new Alaska District created in 1946. The Division Engineer agreed to this change, but with a proviso that the new district would handle only military affairs because of its small staff. This situation continued until 1949 when the Division transferred the civil works functions to the Alaska District.³⁷

In 1948, the Chief's Office created a fourth District at Walla Walla to handle construction of McNary dam at Umatilla Rapids, to design the first of the four lower Snake dams, and to plan for a flood control dam on the Boise River. The new districts and projects represented significant changes in the Pacific Northwest during the war. From 1939 to 1944, energy output from Bonneville and Grand Coulee had increased from 192 million to 9 billion kilowatt hours. Twelve large aluminum processing plants had been built at a cost of \$160 million. By the fall of 1945, the Pacific Northwest was experiencing an unprecedented and unexpected increase in demands for electrical power. Faced with the end of surplus power, major private utilities and the cities of Seattle and Tacoma joined in supporting new generating facilities at



Pouring of the first concrete at McNary Dam, 1948.

federal multiple purpose dams. Noting that 1,565,000 kilowatts would be required by November 1953, the region urged Congress to appropriate funds to the Corps and the Bureau to construct hydroelectrical projects to supply this power, and to the Bonneville Power Administration to build adequate transmission facilities. Data from the Federal Power Commission showed that between 1940 and 1946, peak-load

demand in the Pacific Northwest had increased 102 percent compared to a national growth rate of 58 percent. With this data and unified support for power development, the North Pacific Division entered a new era of major construction. Unlike the 1930s, justification for these massive projects was undisputedly based on economic need and firm power markets.³⁸

CHAPTER 8. ENDNOTES

1. For information on the deterioration of the forts see ARCE 1872, p. 24; ARCE 1875, p. 28; ARCE 1878, pp. 27–28; and, ARCE 1884, pp. 54–55. For a general summary of Northwest Coast and Puget Sound defenses see Willingham, *Army Engineers and the Development of Oregon*, p. 70; and, Green, *Seattle District History*, p. 2–5.
2. U. S. Army Alaskan Command, *Building Alaska with the U.S. Army, 1867–1962*, pp. 49, 54–57; W. A. Jacobs, *The Alaska District, U.S. Army Corps of Engineers, 1946–1974* (Elmendorf Air Force Base, Anchorage: U.S. Army Corps of Engineers, Alaska District, 1976), p. 13; Anthony J. Dimond, “The Strategic Value of Alaska,” *Military Engineer*, 33:187 (Jan.–Feb. 1941), pp. 13–20.
3. Jacobs, *History of the Alaska District*, p. 13.
4. *Ibid.*, pp. 10–11, 13.
5. Karl C. Dod, *The Corps of Engineers: The War Against Japan. United States Army in World War II: The Technical Services* (Washington, D.C.: U.S. Army, Office of the Chief of Military History, 1966), pp. 12–13; Lenore Fine and Jesse A. Remington, *The Corps of Engineers: Construction in the United States* (Washington, D.C.: U.S. Army, Office of the Chief of Military History, 1972), pp. 91, 244–251, 441, 464–65.
6. Scheufele, *History of the North Pacific Division*, p. 15; *Southwest Builder and Contractor*, 100:25 (18 Dec. 1942).
7. Willingham, *Army Engineers and the Development of Oregon*, pp. 124–25.
8. Green, *Seattle District History*, p. 3–40.
9. *Ibid.*, pp. 3–6, 3–7.
10. *Ibid.*, p. 3–25.
11. Maj. John Ohmer to Portland District Engineer, 24 Aug. 1940; Dunn to Division Engineer, 12 Sept. 1940; Maj. Donald J. Leehey, Portland District to Seattle District Engineer, 10 Feb. 1941, RG 77, Seattle FARC, 686.9, “Air Bases”, *Boeing News*, 27 June 1945 and 26 July 1946. Information from Gordon Fernald, retired Chief of Engineering Division, North Pacific Division.
12. Green, *Seattle District History*, p. 3–36. For a detailed description of the defense and engineering implications of the project see Fine and Remington, *The Corps of Engineers*, pp. 650–701.
13. Jacobs, *History of the Alaska District*, pp. 14–15.
14. Speech, Brig. Gen. Benjamin B. Talley, “Building Alaska’s Defenses of World War II,” 26 June 1969, Copy in Alaska District, Public Affairs Office.
15. *Ibid.*
16. Walter K. Wilson, “The Problem of Permafrost,” *Military Engineer*, 40:270 (April 1940), pp. 162–63. For a later report, see William C. Gribble, “Foundations in Permafrost,” *Military Engineer*, 52:350 (Nov.–Dec. 1960), pp. 445–47; and, Lynn C. Barnes, “Permafrost: A Challenge to Engineers,” *Military Engineer*, 30:245 (Jan. 1946), pp. 9–10.
17. U.S. Congress, House Report No. 1429, “Authorizing the Survey, Location and Construction of a Highway to Connect the Northwestern part of Continental United States with British Columbia, Yukon Territory, and the Territory of Alaska,” 5 July 1935, 74th Cong., 1st sess; U.S. Congress, House Document 74, “Report of the Alaskan International Highway Commission, 20 April 1940,” 76th Cong., 3rd sess; Dod, *The Corps of Engineers: The War Against Japan*, p. 299.
18. Jacobs, *Alaska District History*, p. 17; Dod, *The Corps of Engineers*, pp. 308, 315; John R. Hardin, “Engineers Rush Alaskan Defenses,” *Military Engineer*, 34:195 (Jan. 1942), pp. 1–3.
19. U.S. Congress, House Document 591, “Supplemental Estimate of Appropriations for the War Department . . .”, 16 May 1944, 78th Cong., 2nd. sess.
20. Jacobs, *Alaska District History*, p. 19.
21. Northwest Regional Council, *Pacific Northwest Problems and Materials: An Introduction. Know Your Northwest Series* (Portland: 1940), pp. 45, 49–50.
22. Theron D. Weaver, “The Columbia River Between Vancouver and The Dalles”, *Military Engineer*, 31:176 (March–April 1939), pp. 91–95; Weaver, “The Upper Columbia and Snake Rivers,” *Military Engineer*, 31:178 (Aug. 1939) pp. 254–57.

23. U.S. Congress, "Hearings Before the House Committee on Rivers and Harbors on the Impact of the Snake River," 22 Sept. 1941, 77th Cong., 1st sess., pp. 9-11.
24. McKinley, *Uncle Sam in the Pacific Northwest*, pp. 178-79; 180-83.
25. Ibid, p. 178; Moore to Park, 24 July 1941: Park to Chief's Office, 1 Aug. 1941: Robins to Park, 16 Aug. 1941, Seattle FARC, Records Center, Portland District Records, 77-82-0060, "Lower Snake River," Box 4.
26. Park to Chief's Office, 5 March 1942 with endorsements from Chief's Office and Board of Engineers, RG 77, NA, 111, 7249/439.
27. Ibid.
28. Roy F. Bessey, *Pacific Northwest Regional Planning*, p. 54; McKinley, *Uncle Sam in the Pacific Northwest*, pp. 176-77.
29. Col. Goethals to Division Engineer, 8 July 1943, Portland District Microfilm Files, Box 497, File 1.
30. Gus Norwood, *Columbia River Power for the People*, p. 127.
31. Bessey, *Pacific Northwest Regional Planning*, p. 55; McKinley, *Uncle Sam in the Pacific Northwest*, pp. 178, 466.
32. Ibid, pp. 89-90.
33. U.S. Congress, Hearings Before the House Committee on Rivers and Harbors, "The Improvement of the Columbia and Snake Rivers," 13, 22 and 27 Oct. 1943, 78th Cong., 1st sess., pp. 27, 29, 32, 36-40.
34. McKinley, *Uncle Sam in the Pacific Northwest*, pp. 187-88.
35. Ibid, pp. 184-85; U.S. Congress, Hearings of the House Committee on Rivers and Harbors, "The Improvement of the Snake River," 10 Feb. 1944, 78th Cong., 2nd sess., pp. 2-4, 31-39.
36. McKinley, *Uncle Sam in the Pacific Northwest*, p. 178.
37. Jacobs, *Alaska District History*, p. 25.
38. Preston, *Walla Walla District History*, Vol. 1, p. 39; McKinley, *Uncle Sam in the Pacific Northwest*, p. 188.

IX

THE MAIN CONTROL PLAN



The potentialities of the Columbia River and its tributaries are so vast, and the physical circumstances for their regulation are so favorable that it is possible to develop economically feasible programs not only to meet fully the needs of this generation, but also to allow an ample margin for many years to come.

Colonel Theron D. Weaver
Division Engineer, 1948



The 1948 flood at Vanport, Oregon.

1. Introduction

New industries and population growth in the Pacific Northwest after the war created a demand for more hydroelectric power. As a result of this need for increased power, the Division and its districts prepared a comprehensive review authorized in 1942 and 1943. The report outlined a main control plan that listed proposals for multiple-purpose reservoirs, levees, other works and programs, and sub-basin outlines for important tributaries. It recommended ancillary programs for additional transmission facilities, a lower Columbia fishery plan, an expanded hydrometeorological network, and programs for soil and forest conservation. The review report also represented a significant step forward in federal responsibility for flood control. It was the disastrous 1948 floods that prompted the broad inclusion of flood control in this document. In fact, the event occurred during the final review stages. After personal intervention from President Truman, the Division revised its report to include evaluations of flood problems and flood control benefits.¹

The review report with its main control plan reflected a further stage in interagency cooperation, primarily with the Bureau of Reclamation which coordinated its own survey of the Columbia Basin with the Division's. Despite this cooperation and progress, the new Republican Administration under President Eisenhower rejected the philosophy and programs of the New Deal. It supported a partnership concept in which private enterprise would construct and operate water resource projects that had been investigated and designed by federal agencies. However, private companies were not willing or able to construct large multiple purpose projects that had less profitable features such as flood control. The controversy over the Hells Canyon section of the Snake River brought into focus the theme of private versus public development of power projects.

The Hells Canyon battle also provoked criticism of duplicate responsibilities of the Departments of Army and Interior. The Hoover Commission raised these issues during its investigations in the late 1940s and early 1950s. It proposed creating a separate agency for water resources and removing the civil works function from the Corps of Engineers. Yet, a 1949 agreement between the Secretary of the Army Kenneth C. Royall and the Secretary of the Interior Julius A. Krug produced an amicable settlement between the two agencies based on regional water use priorities.

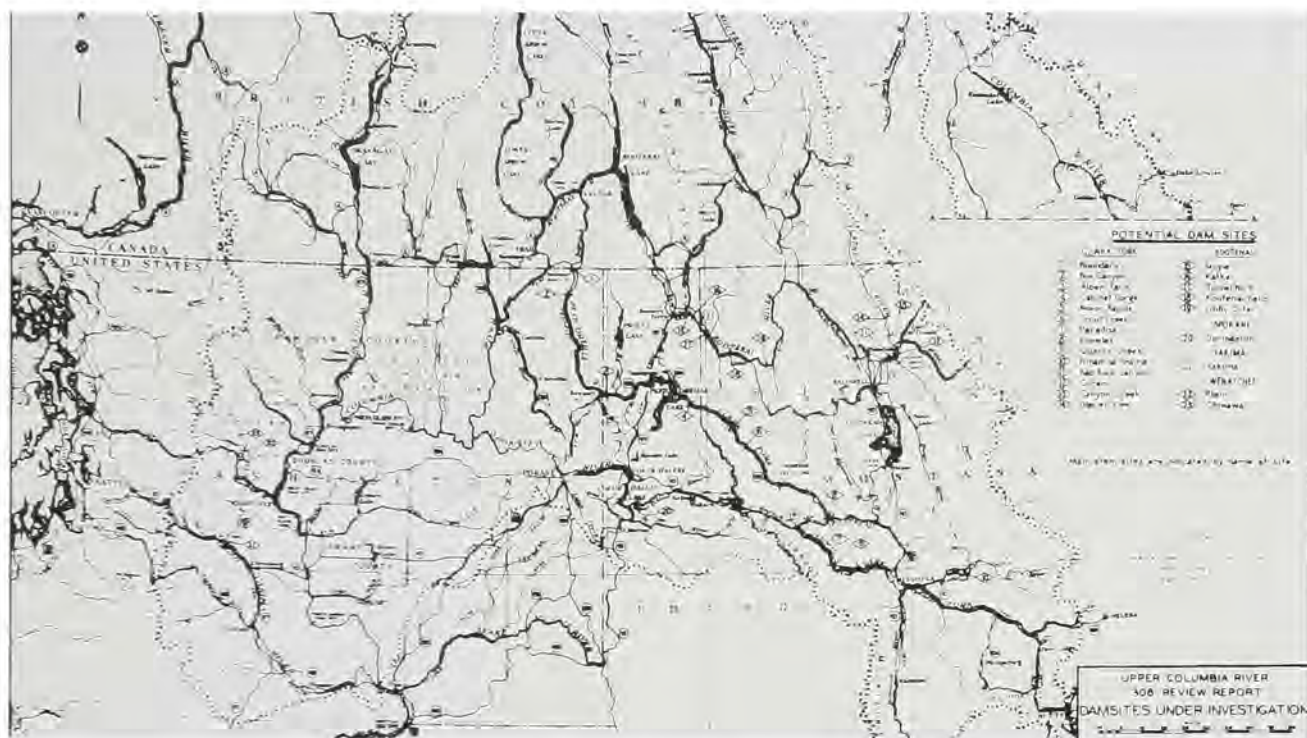
Distribution and marketing of power from federal dams emerged again as a water resources issue in the early 1950s. With the growth of the Bonneville Power Administration and anticipation of new dams and increased power production, President Truman recommended forming a Columbia Valley Authority. This idea had been discussed and rejected in the 1930s. Years later in the 1950s, the storm of protest over this so-called socialistic scheme affected federal and state agencies concerned with hydroelectric production. It also revealed on a national scale the examination and debate over the federal government's role in the Pacific Northwest. Throughout this turmoil, the North Pacific Division anticipated an era of intense construction activity.

Map of Upper Columbia river showing potential damsites as part of the 308 review report, 1945

2. Preparing the Main Control Plan

The third comprehensive review of the Columbia and its tributaries represented a cooperative effort between the federal and state agencies. While not an innovative document, it was notable in the numbers of organizations involved and in the increased importance of review and cooperation between the Bureau and the Corps. In developing the 1948 main control plan, the middle Snake River and upper Snake River Basin emerged as the points of dispute and competition between the two agencies because of the varied benefits – power, flood control, and irrigation – for which each agency had overlapping concerns and responsibilities.

In the 1930s, the Division's concern in the upper and middle Snake River was power. It concluded that below Asotin navigation should have priority, but above Asotin to the Milner Dam in southwest Idaho, power was the most important water resource use. Above Milner Dam, the Division found flood control only of local importance. Although the potential for hydroelectric production was excellent, the Snake River Basin, like the Columbia River Basin, lacked markets for this power.² Portland District's 1941 power surveys identified six possible dam sites on the upper and middle Snake River, the Clearwater and the Salmon. However, the Bureau of Reclamation also had a strong interest in water projects in this region. Division Engineer Colonel Richard Park, anticipating the competition for the authority to develop this area of the Pacific Northwest, advised the Chief's Office that it should immediately approve funds to pursue the investigation of the Snake River "in view of aggressive actions by other agencies" in the same area. A few months later the Bureau recommended that proposed legislation for the Corps'



development of the lower Snake River not be enacted. It claimed that such works would seriously jeopardize current and contemplated reclamation developments in the area, and it reminded the House Committee on Rivers and Harbors that Congress had for a long time designated the Department of Interior as the federal agency to undertake reclamation work. This included constructing, operating and maintaining irrigation and power projects and marketing electrical energy as the Bureau had done elsewhere on the Snake. The Bureau also protested the bill's reference to recreation and wildlife claiming that projects in these areas would impinge upon the functions of two other agencies within the Interior Department, the National Park Service and the Fish and Wildlife Service. The Secretary of War responded that the lower Snake project would have no effect on the Bureau's irrigation projects and therefore would pose no conflict. The Bureau of the Budget thought otherwise. Although no direct conflicts had yet arisen in the preliminary planning stages, it advised the two departments to reconcile differences of program, financial policy and administration.³

Planning for the lower Snake project began in 1942 when Congress authorized the Portland District to review its plans for the lower Snake; then in 1943, it directed the Division to begin a comprehensive "308" review of the Columbia and its tributaries that would include this stretch. The unpublished study of the lower Snake recommended fewer but higher dams with power facilities that would return a large share of the annual costs. It advised constructing five dams, 57 to 100 feet in height, and a sixth dam to be located near the present Ice Harbor Dam with a 35 foot height.⁴

Although preoccupied with military construction, the Division continued investigating the middle Snake River area as part of power studies for the war effort and post-war planning. It submitted interim reports in 1944 and 1945 in lieu of more thorough studies. Mindful of the 1941 admonitions by

the Bureau of the Budget, the wartime Pacific Division directed that further studies should be closely coordinated with those of the Bureau of Reclamation in central and southern Idaho. In 1945 Portland District sent the Bureau its second interim report on the Snake, Salmon and Clearwater Rivers for information and comment. The Bureau's Boise Office advised that the multiple purpose plan for the lower Snake River was clear, well prepared, and satisfactory.⁵

If the field organizations were satisfied with the cooperative working arrangements, the Department of Interior in Washington, D.C. was not. The basis of the conflicts underlying and leading up to the well-publicized Hells Canyon competition lay in the different positions of the two agencies on the comprehensive plans both were preparing. Secretary of Interior Harold Ickes complained to Secretary of War Henry Stimson that navigation and flood control in the Columbia watershed were important but not dominant concerns of water resources projects. Ickes tersely reminded Stimson that the Interior Department had interests that were "paramount" in the development of water resources in the Columbia River area. He pointed out that the Interior Department had responsibilities for irrigation, power sales and transmission through the Bonneville Power Administration, aquatic life through the Fish and Wildlife Service, and other functional interests in conservation and use of water resources in the Basin. Finally, Ickes bristled at the Division's reference to Interior personnel as "assistants" in its own review process. Ickes argued that the War Department should work jointly with the Bureau and not just request its assistance. He suggested this would eliminate duplication of effort and also forestall suggestions that a super executive agency be placed over the two departments. Ickes also wanted the joint investigations conducted at the top level, and he suggested Under Secretary Patterson or Assistant Secretary McCloy from the War Department meet with Under Secretary Fortas of the Interior Department. Ickes advised that they could then

discuss the joint preparation of a report that would accurately reflect the position of the Department of Interior in the Northwest.⁶

Although a joint report might have prevented some future difficulties, especially with the Hells Canyon project, the War Department's position was based on Congress's instructions for the survey. It expressed its willingness to discuss means of strengthening cooperation with the Bureau or any other agencies, but it maintained that such a joint report would be inappropriate. Piqued by this response, Interior resorted to another argument. It cited bad publicity from Congress, the press, State officials and local organizations "decrying the confusion of Plans with respect to the development of our rivers." It further insisted that the two departments undertake all necessary steps to eliminate the conflict. Although the War Department declined a joint investigation, it readily agreed to a conference on the Columbia review studies.⁷

Despite the fact that basic policy on Basin surveys was made and debated in Washington, D.C. on the Departmental level, the lower echelons forged sound working relationships among themselves, partly because of the large amount of data to be collected and the necessity of coordinating the work of one agency with another. The Division's preliminary work, the 1944 program for the Columbia River Basin problems studies which had irritated Ickes, admitted this: "The comprehensive study of the Columbia River Basin is of such magnitude that it will be separated into several parts or problems. . . So that the results of the investigation will not conflict with the ideas of, and will be acceptable to, other federal departments and to state and other local interests, these other agencies will be requested to assist wherever appropriate." In lieu of a joint report, the Portland and Seattle Districts, under the Division's supervision, sponsored numerous conferences, conducted public hearings, and contacted federal and state agencies and other organizations in the Basins on each problem area of the comprehensive report.⁸

The two agencies disagreed on construction schedules for the Columbia and Snake dams. In 1947 the Interior Department attempted to postpone dam construction on the main stem of the Columbia River below the Okanogan River with the exception of McNary Dam, and on the Snake River below the mouth of the Salmon River, a major spawning area for salmon. In the interests of conserving the anadromous fish runs, Assistant Secretary of the Interior Warner W. Gardner suggested to the Federal Interagency River Basins Committee in March 1947 that a ten-year moratorium on construction be adopted to give fish and wildlife agencies the opportunity to research and prepare plans. The moratorium would be enforced only if alternate forms of energy could be developed to meet power needs. In the Division's view, enforcing the moratorium would have a devastating effect upon its plans and programs. The Federal Basins Committee referred the proposal to the regional Columbia Basin Interagency Committee which decided to hold a public hearing, inviting interested parties but not federal agencies to testify. At the two-day June meeting in Walla Walla, 36 people spoke in favor of the moratorium and 26 against. Among the opponents were members of several Indian tribes. After the meeting, the Columbia Basin Interagency Committee authorized a fish and wildlife subcommittee to coordinate their concerns with those of water resources. A fact-finding subcommittee including representatives of the War Department, Federal Planning Commission and the Interior Department began analyzing the testimony and securing

additional facts for its recommendation to the Federal Basins Commission. The subcommittee discussed problems of fish, power, irrigation, and flood control with experts in the field, discovering a "plethora of opinion" but a "paucity of fact," especially surrounding fish migration. After a prolonged and somewhat heated review of the findings, the subcommittee concluded that the facts did not justify a moratorium.⁹

Upon receiving the report in September 1947, the Columbia Basin Interagency Committee recommended dam construction proceed on schedule with all possible speed and prompt authorization of upstream dams. The Committee added that national defense needs also dictated the construction of the lower dams at The Dalles, John Day, and Arlington, Oregon. It advised that until the fish problem was solved, upstream dams should be constructed first.

In November the Federal Inter-Agency Basins Committee approved the recommendation, and the Columbia Basin Interagency Committee appointed a new Fish and Wildlife Committee composed of federal and state officials. Although the Committee attempted to assist fishery professionals, and proposed financing a research and construction program through a federal power tax, fishery officials and power interests quickly defeated these efforts. Another endeavor in 1957 to promote fish conservation and raise funds through the Columbia Basin Committee was also futile, again due to opposition of fish and wildlife agencies. Thus, although the threatened moratorium on dam construction was averted, a cooperative interagency effort to assist fish conservation did not succeed. The Division did initiate its own Engineer Fishery Research Program and hired a full-time aquatic biologist to study fish passage.¹⁰

Another important step for the Division in preparing the "308" review was investigating dam sites for the lower Snake River project. In 1944 Major Lewis of the Portland District inspected several sites. He concluded that, despite previous surveys and reports, insufficient information existed for the Snake River project. The plan for ten low dams as recommended in House Document 704 was inadequate, and it would be a very expensive undertaking. On the other hand, he found that suitable locations for high dams were rare. Nonetheless, Lewis was optimistic, having found a sufficient number of good locations between Lewiston and Pasco. Moreover, his calculations indicated that the power generated would justify construction.¹¹

Two months later, Lewis accompanied Portland District Engineer Colonel Ralph A. Tudor in a survey of the upper Snake River. Their tour included meetings with state officials and local residents who welcomed the Corps' assistance with flood protection but feared that multiple purpose projects downriver might conflict with irrigation projects in the Snake Basin. As the party traveled upriver, the reception became more reserved. At Twin Falls, Idaho, Governor Clarence Bottolfson spoke pointedly about the desirability of state control of water resources. Although he complimented the Portland District, Bottolfson also outlined his objectives to water resources legislation which conflicted with irrigation. The next day, at a meeting of the Idaho State Reclamation Association, Colonel Tudor endeavored to explain that the role of the Army Engineers in water resources development did not conflict with irrigation. The audience was polite and interested, but disinclined to change its opinion. The productivity of the upper Snake River Basin impressed Mr. Lou Stanley, the Division's engineering representative on the

inspection trip. Stanley also clearly perceived the need for adequate and substantial flood protection for this region.¹²

After passage of the 1944 Flood Control Act in December with its specific provisions for interagency review and cooperation, representatives from the Chief's Office joined Lewis in another tour of the Snake River Valley. The purpose was to gather background information in order to compare the Bureau's reports with the Division's. The group examined dam sites, additional storage projects, and the possibility of expanding irrigation in the Snake Basin between Jackson Hole and Boise. The fertility of the non-irrigated land, excellent flood control possibilities at the Lucky Peak site above Boise, and possible recreational and power developments on the Salmon River tributaries impressed the representatives of the Chief's office with the importance and possibilities of further development. They recommended proceeding immediately with project planning and promised full support of the reports.¹³

Some areas to be surveyed were still without highways or roads. In 1946 Portland District dispatched two engineers on a reconnaissance trip down the remote middle fork of the Salmon in Idaho's primitive area. Karl MacDuffee and D. H. Meldrum started on foot along a Forest Service trail, carrying seven days of supplies in back packs. They intended to walk 140 miles in seven days to a road at Big Creek. As they walked, the trail became increasingly difficult. They traversed great areas of rock slides that rapidly cut into their shoes. By the third day, they realized they might not be able to keep to their schedule, and on the fourth it was apparent they would run out of food. On the fifth day, with shoes punctured by rocks, nearing the end of their food supply, and with 95 miles to go, they found a telephone at a landing field in the area and summoned a plane to take them to Big Creek and their auto. Later called upon to justify this expense MacDuffee explained, "It was the only way out, and to not have taken it would have endangered our lives."¹⁴

In preparing plans for the Snake River, the Corps faced the problem of the adverse effects of dams on fish migration. The Snake projects brought to a head the conflicts over protection of fishery resources. Of course, fish conservation was not an issue unique to the Snake River. Proposed dams along the middle and upper Columbia River and the Rogue River Valley in Oregon were also encountering opposition. However, the Snake River and its tributaries were the spawning areas for salmon and steelhead trout, making this part of the Columbia River system particularly crucial in preserving fish runs. In 1946 during the planning stages, Portland District sought the Oregon State Fish Commission's advice and cooperation on the multi-dam plan for the Snake River. Their prognosis was definitely pessimistic. The Commission stated that in lieu of scientific evidence it could not recommend any one plan. Moreover, it believed that regardless of which plan was finally chosen, the effect would be to materially reduce, if not completely annihilate, the runs of salmon and steelhead in the Snake River Basin. In addition, the extreme ecological changes caused by the dams would seriously affect the resident trout population. The Oregon Fish Commission warned that these structures would eliminate all the runs of salmon spawning in the main Snake River and probably prevent passage of mature fish and fingerlings over the dams. "We do wish to remain as objective as possible," it added, "although at times . . . this is extremely difficult to do." The Washington Department of Fisheries and the Fish and Wildlife Service offered similar opinions.¹⁵

The denouncement of the Bureau's and Division's plans for the middle Snake and the ensuing competition between the two agencies became a source of criticism and unfavorable publicity. For its December 1947 meeting at Baker, Oregon, the Columbia Basin Interagency Committee asked the Division to present its findings on the Hell's Canyon project. After a morning presentation by Portland District Engineer Colonel Walsh on the proposed Hell's Canyon, Mountain Sheep and Nez Perce dams, E. N. Torbert of the Bureau – to the Committee's surprise and consternation – gave an unexpected brief outline of the Bureau's own plan for the Snake River Canyon. The proposed dam site he described was one the Division had explored earlier and then abandoned, and it was also higher than the dam the Division recommended. A neutral spectator suggested a joint investigation, a suggestion which the participants received in silence.¹⁶

After the meeting, Chairman Torbert detailed the Bureau's plans to the press. The local paper carried a feature story on the Bureau's Project, illustrated with a photo of Boulder Dam superimposed on the canyon, but facing the wrong way. The Division's representative later remarked that the incident thrust again into public view "the then fiercely competitive posture of the Bureau and the Corps, . . . a posture which conscientious officials of both agencies and the Committee had made great conciliatory efforts to modify." Later events revealed that the two agencies had freely exchanged information and that duplication of effort was insignificant.¹⁷

3. The 1948 Review Report and the Main Control Plan

Although the Division and Districts had prepared numerous surveys and reviews of the Columbia River and its tributaries since initial legislation in 1927, the 1948 review authorized by the Senate Committee on Commerce in 1943 represented considerable progress in multiple purpose development. The Division gave full attention to fish conservation and considered pollution, domestic water supply and recreation. It also acknowledged flood control as a major factor in water resource planning. However, insertion of flood control calculations into the planning document resulted from the 1948 disastrous floods along the Columbia River system. When the floods occurred, the Bureau of Reclamation had completed its report, and the Division was in the final review stages.

A combination of meteorological conditions in the Pacific Northwest – an unusually heavy snowpack that winter, above average warm temperatures that hastened snowmelt, and a record downpour of rain from mid-May to early June – caused the record flooding. The tributaries and main stem of the Columbia crested, and by late May runoff inundated The Dalles-Celilo Canal and overtopped the McNary cofferdam. On the lower Columbia River, railway lines, highways, shipyards, airports and docks were in danger of being swept away. Portland District aided flood control with efforts ranging from sandbagging levees to evacuating residents. At the end of May, the river gauge at Vancouver, Washington, reached 25.4 feet, 5.4 feet above flood stage, with predictions of an additional rise of 4 feet. This would raise the water two feet above the top of the levees. The flood peaked at The Dalles on May 31 with a flow of 1,010,000 cubic feet per second, almost twice the volume of the average annual peak discharge of around 583,000.



Flood waters at Vanport, Oregon after collapse of a railroad dike. May 30, 1948.

The flood's worst damage had occurred the day before at Vanport, Oregon. During the war, the city had been hastily constructed as a temporary housing project to accommodate new workers at the Kaiser shipyards. It was located on reclaimed swamp land and surrounded by a fifty-foot fill that served both as a railway trestle and as a dike. After the war many workers stayed, although the housing was deteriorating. Early Sunday morning on May 30, the Portland Housing Authority distributed a circular advising residents that the dikes would hold the flood waters, giving them time to evacuate. That afternoon, however, while a Corps inspector was at the scene, the railroad trestle fill suddenly collapsed, allowing only five minutes for people to escape. Most were forced to flee on foot as roads quickly clogged with stalled automobiles. One hour and forty minutes later Vanport was totally submerged. At least ten lives were lost. The Vanport tragedy ignited widespread criticism of the Corps and of city and federal governments for failing to give adequate protection and warning.¹⁸

The flood's effect on future planning and construction in flood zones was considerable. On June 1 President Truman directed the Departments of Interior, War and Agriculture and the Federal Works Agency to assist the flooded areas and prepare a report. In view of the serious flood damages, he also ordered the Corps and Bureau to revise and coordinate their reports in respect to flood storage. They were directed to provide an accurate evaluation of problems and benefits from future flood control works in the Columbia Basin. The costs of the flood in terms of property and human life substantially increased support for flood control measures in Congress and also throughout the nation which had anxiously followed the flood's progress in newspaper and radio reports. Praise for the Division's revised report, described as a bold and comprehensive plan for the Columbia River, countered local criticism and charges of conspiracy against the Corps for failing to adequately warn Vanport.¹⁹

The final 1948 Review was a massive work of eight volumes. It included comments from state and federal agencies and it incorporated new data and calculations on flood control. The Bureau had completed and submitted its own report in February 1947, but in order to carry out President Truman's directives, a field committee reviewed long-range plans in view of flood control needs. Completed in December, this review later was expanded into a formal agreement between the agencies and their respective departments.²⁰

The essence of the Division's 1948 Report was the main control plan of multiple-purpose reservoirs and lower Columbia River levees which the Administration and Congress were prepared to support and fund. The plan brought together physical and economic data on the Columbia Basin, and it reflected the expanding scope and responsibilities of the Division in fish and wildlife conservation and its cooperation with Canada in developing storage and power on the upper Columbia. It also emphasized the current concerns in the Pacific Northwest over the appalling damages from floods and also the present and potential unmet demands for hydroelectric power, a critical factor in water resource development. Admitting that fish conservation had been largely neglected in the past, the main control plan promised to conserve salmon fishing resources as far as practicable, including hatcheries to offset depletions.²¹

The projects recommended in this plan represented only a small minority of those investigated. Some projects in northern Idaho and western Montana had been deleted (including Paradise on the Clark Fork, Springston on the Coeur d'Alene, Nez Perce at the mouth of the Salmon River, and Kooskia on the Clearwater) because of strenuous objections. Others could become justifiable in the future. The Division designated 150 sites with potential merit as elements of a flexible long-range plan. In addition to the five dams already built or under construction in the Willamette River

Basin, the report recommended a system of 16 multiple purpose reservoirs with levees, drainage ditches, and other works to prevent floods and increase water flow during the low water season to alleviate polluted and unsanitary conditions.

In planning water resources development on a basin-wide scale, the report outlined general considerations for operating multiple purpose reservoirs. It proposed variations in operating procedures based on regional or local priorities. Along the navigable channel from Lewiston to the sea, navigation would have to be integrated with other uses. The projects in the Willamette sub-basin would be operated primarily on a local basis because their contribution to the region's hydroelectric production was secondary in nature. Where the major concern was irrigation, the operations would also be based on local needs.

The main control plan supported coordinating operations on a regional scale, similar to procedures regulating Grand Coulee and Bonneville power. It advised that increased storage at Grand Coulee, Hungry Horse and the Hell's Canyon project, as designed by the Corps, would fulfill these objectives. By introducing regulations for seasonal drawdowns and storage, the report foresaw no substantial conflict between the three principle uses of water – navigation flood control and power. The Division's report also concluded that there was no conflict with the Bureau's revised report that recommended construction of ten new dams and irrigation projects.²²

The review report discussed flood control relative to the expansion of agriculture and construction on the flood plains. It warned that repetition of the 1894 flood on the Willamette River would cause \$350 million in property damage. The recent flood on the Columbia, although generally less severe than the 1894 one, had caused \$102,725,000 in damages, destroyed 38,000 homes and taken 38 lives. Flood control was now a necessity throughout the region.²³

In the area of navigation, the Division reported a 13 percent increase in tonnage upstream from Bonneville since 1938. Tonnage through The Dalles Celilo Canal was also expanding, from 44,000 tons in 1938 to 835,000 tons in 1947 despite navigational hazards and delays. The Division estimated that river traffic to Lewiston would increase to an estimated 5 million tons average when the waterway project was completed. Navigation locks would encourage pleasure boating, and this recreational value would increase the cost-benefit ratings of the entire system.²⁴

The most important benefit of the main control plan was power. The Division maintained that the potential monetary value of power greatly exceeded that of irrigated lands, forests, minerals, fish, or any other resource presently known in the Basin. Looking back to the 1930s, the report noted that Grand Coulee and Bonneville had been pioneering steps and that many had doubted their economic justification. These two projects, which represented only 5 percent of potential Columbia River power, had stimulated industrial expansion and met the burden of war. Existing power markets already greatly exceeded the dams' generating capacity. In the Division's opinion, there was no doubt further power development was needed. It stated that both private and public power companies believed that the federal government should have major responsibility for producing hydroelectricity. "Already the admission of new industries to the region is limited by the lack of adequate amounts of power," the report concluded, "... and the lack of any alternative energy source

makes the development of the Columbia River power a national problem."²⁵

The Division's report also acknowledged the importance of Indian Treaty rights in the development of the Columbia River and its tributaries. It pointed out that the main control plan would affect this group's "inherent and acquired rights... of taking fish at all usual and accustomed places" as well as inundate some of their lands. Because of the special status of reservations, submerging Indian land and fishing sites would create special legal problems. It advised special government action in relocating tribal lands, communities, and burial grounds. The report further suggested the government consider the general social problem of a satisfactory mode of life for the Indians if they were displaced and their legal right to reimbursement. The most pressing issue might be fishing grounds which the government had no right to acquire without a full substitution of equivalent sites or payment of just compensation. In the lengthy procedures to be undertaken in the future, the report suggested settling problems in advance to avoid costly litigation.²⁶

The Division's report identified fish conservation as another vexing issue. In terms of its social, economic and political implications and the intransigent stand of competing users and uses, this became the most explosive and emotional issue connected to water resource development in the Pacific Northwest. The Division, as a prominent developer of water resources, addressed this issue in some detail. Its main control plan was one of multiple use which recognized sport and commercial fishing as a valid use of water resources, especially as the average annual catch of salmon on the Columbia River was valued at \$20 million. "Although this one use of Columbia River obviously cannot prevent development of other uses essential to the growing economy of the region," the report stated, "every reasonable means must be adopted to assure the fishery resource its proper place as the other water resources are developed." The solution would be a few large multiple purpose projects that either would not block fish runs or would have fish passage facilities. The report contended that the main control plan had been carefully adapted to conserve this resource. To this end, the Division had cooperated with state fishing authorities in developing the Lower Columbia River Fishery Plan for improving the fishery resource as proposed by the Fish and Wildlife Service. The report also addressed the concern that a combination of irrigation diversions, pollution, and dams without modern fish passage facilities might eventually exterminate salmon runs. In the case that these worst fears were realized, the Lower Columbia Plan with provisions for fish hatcheries would preserve endangered salmon species.²⁷

In summing up its position, the report pointed to the Division's active assistance in fish research through funds and personnel and its selection of projects least harmful to fish. For example, the Division had not recommended Nez Perce Dam at the mouth of the Salmon River although it was a particularly valuable project in other respects.²⁸

Public response to the report was unusually lively because of the 1948 floods and the inclusion of some controversial projects, like Nez Perce, even though they were not recommended. Although most witnesses at the public hearings testified in support of the main control plan, fishery interests, local residents and Indians opposed nearly every project. The Washington Department of Fisheries criticized the Division and other federal agencies for reducing complex biological issues to a simple statement that complete facilities for the

passage of fish would be provided in the dam structures. It recommended that the four lower Snake and three Columbia dams at John Day, The Dalles, and Priest Rapids be delayed until it was necessary to sacrifice fishery resources to the overall economy of the region.²⁹

Another well-publicized protest focused on a proposed dam and reservoir, Glacier View, which would encroach upon land in Glacier National Park. The National Parks Association protested that the project would violate provisions of the law establishing Glacier National Park, as well as Congress's intent in establishing national parks. Furthermore, local interests and Indians opposed an alternate site at Paradise. The Glacier View protest revealed a growing constituency of conservationists who objected to being excluded from the planning and review process. An editorial from *The National Parks Magazine*, introduced as testimony into the 1949 hearings, noted that although the conservationists had overwhelming support for the preservation of the Park boundaries, by the time a public hearing had been held, the project was well underway. "It already has been given a name; and it is recognized as a full-fledged plan approved by the engineers who have already obtained much support." The editorial also complained that although the public reviewed a plan before Congress took action, the existence of a concrete plan put conservationists at a considerable psychological and political disadvantage. One remedy would be including the wilderness preservationist and the recreationist with the engineer in the early planning stages.³⁰

Nonetheless, the mood in the Pacific Northwest definitely favored multiple-purpose projects. The Board of Engineers held four public hearings in January and February 1949, at Spokane, Seattle, Portland and Boise. The majority of witnesses at the four public hearings expressed general approval of the comprehensive plan and urged early construction, especially for flood control. Those who spoke on fish conservation proposed building upstream projects first, to allow time for the development of the fish and wildlife program and to preserve areas below McNary Dam as a fish sanctuary. Even here, this interest group generally approved provisions in the plan for preserving and propagating anadromous fish. In its review of the hearings, the Board of Engineers stated that these relatively minor problems, such as Indian fishing rights and fish sanctuaries, could be equitably adjusted during the planning and construction phases.³¹

4. Hells Canyon Dam and Interagency Agreement

The main control plan also represented an inter-agency struggle over who would develop the Hells Canyon section of the middle Snake. The resolution of this issue led to a final, comprehensive agreement between the two water development agencies. The steep canyon site was well suited for a high dam and power production. It could provide more storage capacity than other locations in the Columbia Basin, and regulation of the reservoir would aid navigation through the downstream rapids and control flood water. Proponents of the dam pointed out that unlike other projects, a dam at this site would not inundate valuable farmland or compete with irrigation storage in the Snake Basin. Portland District described the Hells Canyon project as able to produce large blocks of power to meet the region's increasing demands for electricity.³²

Before it was decided which agency would have the authority to develop the middle Snake, power and commercial interests in Portland, Tacoma, Seattle and Spokane carefully avoided being drawn into the contest between the two agencies, although they urged cooperation. Representatives from private and municipal power companies and chambers of commerce of those cities met in January 1945. At a second meeting, officials from the Corps, Bureau, and Bonneville Power Administration joined them in a round-table discussion of regional power needs. After saying that they would not take sides in the "Reclamation Service-U.S. Engineer Corps contest," these interests stated that the Corps and Bureau should be the ones to advise Congress which federal projects to undertake.³³

Promoters of the Hells Canyon project found little support among representatives of these cities which had little need for power from this part of the Pacific Northwest. The Portland Chamber of Commerce strongly opposed a large multiple purpose dam that the Corps had recommended. It asked General Thomas Robins, now retired and the head of its subcommittee on water resources, for his opinion. Robins stated he could not recommend its construction now or in the near future. He recommended that Portland support the private Idaho Power Company's plans to construct their own Oxbow project. As a former Division Engineer and private citizen, Robins advocated the Division's traditional balancing of water resource development with power markets. "The development of our natural resources has become so important to the nation's welfare, and now involves works of such magnitude," he wrote, "that it may be taken for granted that the future power needs of the Pacific Northwest will be met by construction of Federal multiple purpose projects" Nonetheless he warned that the immediate problem in the Columbia Basin was not in the planning or construction, but in finding ways and means to prosecute the programs without undue delay or unreasonable cost. While praising the Division's comprehensive plan, Robins suggested postponing, for as long as possible, construction of multiple purpose projects producing large blocks of power at great distances from major load centers. However, Robins' advocacy of progressive development keyed to a demonstrated demand for power lagged behind the Division's main control plan which the Administration and Congress supported.³⁴

Debate over Hells Canyon revealed the underlying issues of interagency competition and overlapping of functions. Fortunately, the two agencies arrived at a practical solution in late 1948 and 1949 with two agreements, first, between field staffs and then at the departmental level in Washington, D.C. The agreement between the two departments had a precedent in the Pick-Sloan plan for the Missouri Basin. Here the well-publicized competition between agencies involved in preparing a comprehensive plan led to the agreement authorized by the 1944 Flood Control Act. In the Pacific Northwest, the Snake River Basin (and Hells Canyon dam in particular) provided the catalyst for agreement. There were two steps involved: first, coordination of the Corps' and Bureau's comprehensive reports on the Columbia and its tributaries; second, the agreement between them on overall responsibilities for developing water resources in the region. On September 16, 1948, Truman directed the Corps to coordinate its plans with other interested federal agencies, including the Bureau. The Division's Gordon H. Fernald and the Bureau's E. N. Torbet quickly reconciled the technical aspects of their reports. On December 7, they submitted the

Site for Ice Harbor Dam
on the lower Snake River.



joint memorandum to Division Engineer Colonel Theron D. Weaver and to the Bureau's Regional Director Robert J. Newell. The memorandum concluded that the technical aspects of the two reports were without significant conflicts and all differences were fully reconcilable.³⁶

The Columbia Basin Interagency Committee heartily encouraged these efforts. It hosted a meeting at which state and federal officials spoke strongly in favor of improved coordination and a basin-wide plan. During the next two months, the committee discussed the technical aspects and studied policy coordination of the so-called Newell-Weaver agreement. Although this agreement succeeded in resolving most conflicts, these questions remained: who would build the high Hells Canyon Dam, and should a dam be built near Glacier National Park? On February 21, the Columbia Basin Committee forwarded the Newell-Weaver agreement to its parent organization, the Federal Interagency River Basins Committee. A task force recommended further coordination, but the conclusion of the departmental agreement a few months later made this step unnecessary.

Upon learning that the Bureau's regional office and the Division would be working next on policy questions, the Interior Department authorized the regional director to continue discussions with the Division. However, Interior retained its close supervision of the field committee. A major obstacle to the final agreement was the Corps' proposed Glacier project. The Bureau contended that a dam at this site would back water into Glacier National Park. The two departments also disagreed over using power revenues to finance irrigation projects in the Pacific Northwest. On February 2, 1949, Secretary of Interior J. A. Krug approved the Bureau's reports and authorized further consultations between the Bureau and the Corps. The agreement was concluded in April, and the Secretaries of Interior, Julius A. Krug, and Army, Kenneth C. Royall, jointly informed President Truman that plans had been fully coordinated. They also affirmed that these plans would provide a basis for incorporating additional

projects in the future. In practical terms this meant the Bureau would construct a dam in Hells Canyon on the Snake, and the Corps would construct Chief Joseph on the lower Columbia, and Lucky Peak Dam on the Boise River. The Department agreed that in new investigations and projects, the Corps would be responsible for navigation and flood control while the Bureau would be accountable for irrigation, drainage, and domestic water supply.³⁶ In considering multiple purpose developments, the Krug-Royall agreement established geographical boundaries for each agency's water resource work. To the Corps it ceded development rights on the main stream of the Columbia below Grand Coulee, the lower Snake River below the mouth of the Grand Ronde, the Willamette River Basin, the Columbia's northern tributaries, and the Kooskia project on the Clearwater River. This left the Bureau in charge of new projects on the middle and upper Snake River Basin, eastern Oregon, and Washington's central basin. The agreement deferred action on the Glacier View and Paradise projects and accepted the Bureau's proposal for using regional power revenues to subsidize irrigation under reclamation laws.³⁷

The 1948 review reports and the 1949 Krug-Royall agreement broadened the scope and comprehensive planning for water resources regionally and nationally. In 1950 the President's Water Resources Policy Commission released its multi-volume report that anticipated the future development of the nation's water resources. The Corps' report on the Columbia Basin played a significant part in this national document.³⁸

5. The Columbia Valley Authority

The 1950 River Basin Report integrated national and interagency efforts for rational planning of water resources. However, in the Pacific Northwest a major struggle continued over the issue of marketing power which was first raised in

1937. The Government formed the Bonneville Power Administration to market power from Bonneville and Grand Coulee, but some hoped for another type of agency to handle power from the new dams.

In 1945 Washington Senator Hugh Mitchell introduced legislation for a public corporation with an advisory council of state and public representatives to transmit and market power. This would insure cooperation with federal agencies and protect states' water rights. Under the proposed legislation, a Columbia Valley Authority would have enjoyed discretionary control over power revenues and thus not be as dependent, as was Bonneville Power Administration, on annual appropriations. The provisions of the first Mitchell bill gave the Columbia Valley Authority general jurisdiction in planning, building and operating projects concerned with water development in the Columbia Valley region, including flood control, navigation, power generation and transmission, reclamation, domestic water supply and port facilities, as well as authority over land resources and wildlife conservation. Under the act, employees of the Bonneville Power Administration, the Bureau, and the Corps could be transferred to the Columbia Valley Authority. A second bill introduced in December 1945 relinquished more control over water to the states, but it retained the substantive powers over multiple purpose water functions and transfer of major river projects. If passed, it would have authorized the Columbia Valley Authority to absorb the civil works function of the Corps.³⁹

Although state granges favored the Valley Authority plan, the National Reclamation Association and state reclamation groups initiated strong opposition. The plan also spurred backers of the federal water agencies to work against it. Private utilities, chambers of commerce, newspapers of small and large communities, and state legislators joined the campaign to defeat the Columbia Valley Authority. However, failure of the second Mitchell bill and similar proposals in 1947 did not indicate unqualified support for the status quo. With the end of New Deal planning agencies and philosophy, the concept of private development of water resources gained public support.⁴⁰

Opposition to the Columbia Valley Authority also arose from the older struggle of "bus-bar" versus "postage stamp" power rates, in particular from Portland's insistence that a zone be adopted giving rate preference to those industrial areas nearest the generating points. Portland still feared losing an advantage of cheap power for industrial growth to Seattle, Spokane and Tacoma.⁴¹

Politics influenced most of the arguments against the Columbia Valley Authority. Opponents of the New Deal charged that federal ownership of water resources and the creation of a super power agency was socialistic and un-American. In fighting the Columbia Valley Authority plan, W. D. B. Dodson, longtime spokesman for Portland interests, convinced the Mid-Columbia chambers of commerce to organize a committee to investigate the power issue and take a strong stand. Dodson proposed an alternative plan of selling power at the generating plant to private distributing agencies.⁴²

General Thomas Robins supported private development and distribution of power. His pamphlet, "Development of our Natural Resources," written for the Pacific Northwest Development Association in Portland, firmly opposed the Columbia Valley Authority. It pointed to the great strides and sound, orderly method already being pursued by Congress and the Administration in developing natural resources and

preparing basin-wide plans. It described how the new agency with its unlimited power would create a regional socialism, placing the social, cultural and economic welfare of the entire region in the hands of a board, responsible neither to the people nor to Congress.⁴³

A few weeks later Senator Warren Magnuson and 17 other senators introduced a bill to create a Columbia Valley Administration (dropping the more politically charged word "Authority"). This body would assume all duties performed by the Bureau and Bonneville Power Administration in the Columbia Basin and all river and harbor work performed by the Corps except channel and harbor work in tidal waters. Under the proposed legislation, the Columbia Valley Administration would have principal responsibility for all natural resource planning in the region. The Interior Department supported the proposal (as it had previously supported the 1945 Mitchell bills) and directed its offices to collect pertinent data and information. Assistant Secretary of Interior C. Gerard Davidson sent a series of interrogatories to the Division and other federal agencies. North Pacific Division staff members spent hundreds of hours responding to detailed and complicated questions on every aspect of the Corps' operations, and they also provided data to opponents of the Columbia Valley Administration. Some Division employees found it difficult to maintain objectivity and neutrality during this process. After the Senate Public Works Committee held hearings on the bill in June 1949, the bill died in Committee.⁴⁴

One reason for its demise was an effective propaganda campaign by opponents like the Pacific Northwest Development Association. The Association warned that the Columbia Valley Administration would replace local representative governments with a three-man dictatorship. "This corporation," one brochure proclaimed, "would push aside experienced agencies like the Bureau of Reclamation and Army Engineers . . . and build its own giant organization." The slogan, "The CVA will get you . . . if you don't act now!" reinforced newspaper campaigns against the Senate bill.⁴⁵

The failure of the Magnuson bill to pass out of the Senate committee did not end the Truman administration's interest in consolidating the activities of water resource agencies. In 1950 the Bureau of the Budget publicly pledged its support to the reorganization. It called for a better organizational framework and a more uniform statutory basis for the conservation and development of all natural resources in the Pacific Northwest as proposed in the Columbia Valley Administration. Secretary of Interior Julius A. Krug added his criticism, contending that the joint agreement between the Bureau and the Corps fell short of meeting the need for comprehensive and coordinated development of all resources in the Pacific Northwest. He noted that the agreement did not include soil, forests, and mineral conservation and development. Nonetheless, Secretary Krug described the Interior and Army review reports as a substantial step forward, describing their proposals as the most practicable plan obtainable under the present Federal pattern of piecemeal legislation and divided administration for resource development. Pledging wholehearted support of the Columbia Valley Administration, he observed that its establishment would eliminate these deficiencies, resulting in the "speedier, more effective and more economical development of the resources of the Columbia River Basin".⁴⁶

The Corps of Engineers could hardly endorse a plan removing a major portion of its functions. Moreover, it was satisfied with the status quo and the cooperative relationships with other agencies in the Pacific Northwest. Although Chief

of Engineers General Lewis A. Pick acknowledged that the number of projects in the main control plan would cause increasingly complex problems, he was confident that the cooperative studies and a jointly financed staff would insure success. Pick presented the basin and sub-basin plans in the review report as a carefully prepared framework within which projects necessary for a progressive balanced economy in the Pacific Northwest could be built step by step at a rate keyed to the region's needs.⁴⁷

With the Columbia Valley Administration plan stalemated in Congress, the Bureau of the Budget approved the establishment of the Columbia Basin account plan of pooling power revenues. On this point, the Bureau and the Corps were now in agreement. The Division stated in its review report that Congress had not intended that power sales from each project should be based on construction costs and other factors pertinent only to that project. The report recommended that power rates be calculated on a system basis rather than by individual project. It contended that under this method, rates would increase only slightly over the current basic rate. On a related issue, the Division's report recommended reimbursing a portion of irrigation development costs on a regional basis, and not coupling one irrigation project with a specific project. However, it advised that power projects should not be artificially classified as reclamation projects for the purpose of distributing costs.⁴⁸

Both the Bureau and the Corps endorsed the basin account principle and included it in their agreement of April 11, 1949 (the Krug-Royall agreement). The agreement stated that "financial assistance from all power revenue producing projects in the Pacific Northwest . . . should be pooled and extended to aid irrigation under principles consistent with those embodied in Reclamation Law." The Interior Secretary would administer the account and make recommendations to the President and Congress. Subsequent efforts by Pacific Northwest Congressmen to pass legislation setting up a Columbia Basin account failed, partly because of fears that the fund could be misused to justify unworthy or unpopular projects.⁴⁹

The most serious challenge to the Corps' civil works were two attempts by the Hoover Commission in 1949 and 1953 to reorganize government functions. Those who supported this reorganization feared government intrusion into and competition with the private sector, the increasing growth of federal expenditures, and the lack of integrated planning of national resources. The fact that some twenty-five federal agencies were involved in water resource development and management motivated critics who had previously favored reorganization in the 1930s and the Columbia Valley Administration in the 1940s. As a branch of the military, the Corps of Engineers provided a target for those who wished to consolidate water-related functions and to end the special relationship between Congress and the Corps that other departments did not enjoy. These critics included Arthur Maass whose book *Muddy Waters: The Army Engineers and the Nation's Rivers*, published in 1951, condemned the Corps for failing to meet standards of professional and administrative responsibility. He charged that the Corps refused to assist the Administration and Congress to develop and apply a national water policy.⁵⁰

The first Hoover Commission recommended forming a Water Development and Use Service under the Department of Interior. This agency would include civil works presently under the Corps, the Bureau of Reclamation, Bonneville Power

Administration, Southwest Power Administration, the Division of Power and functions of some other agencies. Proponents of the plan mounted a campaign in the Pacific Northwest that used speakers bureaus and a publicity staff to prepare speeches. Some of the more flamboyant employed phrases like "billions down a rat hole," and attacked the Corps' projects as a pork-barrel system. Some officials of the Division criticized the speakers as knowing little about the subject and making frequent errors in trying to localize their subjects.⁵¹

In 1949 President Truman advised Secretary of the Army Kenneth Royall of his recommendation for concrete legislation to develop the Columbia Basin on an integrated basis by creating a new agency. Truman designated Charles Murphy of the Executive Office to develop this proposal in cooperation with other departments and agencies. While agreeing to cooperate, Royall responded that established federal agencies operating on a national scale should be the ones to plan projects. "The best way to achieve efficient development of the Columbia Valley region," Royall advised, "is through the strengthening and supplementing of the programs of the existing agencies rather than by excluding them from the region." Pointing to the Army's coordination of water resource activities with related regional concerns and the voluntary cooperation among federal and state agencies, he offered to draft legislation that would provide a legal basis for these voluntary arrangements.⁵²

The Hoover Commission's report of March 1949, castigated interagency committees for failing to solve problems of coordination. It blamed the Corps and the Bureau for not allowing these committees to solve their differences. Even the agreements between the Departments of Army and Interior were faulted for not providing an integrated development plan. In defending its civil works functions, both the Division and the Army argued that training in peacetime construction was indispensable during times of national mobilization and in providing logistical support in war zones. As a counter measure to the Commission's charges, the Chief's Office produced its own two-volume study, *The Corps of Engineers Functions and the National Interest: A Study of the Effect of Reorganization Proposals on the National Defense and on Development of Water Resources*. In the Pacific Northwest Walla Walla District Engineer Colonel William H. Whipple presented similar arguments to local audiences, pointing out that engineering successes in World War II resulted from practical experience in the civil works field.⁵³

After legislation for the reorganization failed in 1952, the Hoover Commission made a second attempt. Hoover remarked in 1953 that he hoped this effort would get the federal government out of the business of generating and distributing power as soon as possible. The Commission's task force on Water Resources and Power reasserted the rights of private ownership as part of traditional American philosophy. It opposed what President Eisenhower termed "creeping socialism." However, the task force avoided the issue of reorganizing federal agencies. Instead, it proposed limiting federal responsibility and enhancing that of state and local agencies, and developing projects in conformity with sound business principles and fair returns to the government. It concluded that the Federal Government had become a dominant factor in enterprises outside its domain as established by the Constitution. Ignoring non-federal interests, the government had used water resources and power projects for social and political ends. According to the task force, the government had borne too much of the costs of

these projects, many of which were economically unsound. It also contended that in the water resources field, lack of efficient organizations encouraged controversy, competition, and waste. Although the task force's proposal were not enacted, some critics charged that the Hoover Commission encouraged reactive forces that retarded resource development for years to come.⁵⁴

The task force's investigations continued into 1954 with hearings at regional centers and inspections of federal projects. Chief of Engineers General Sturgis instructed division and district engineers to cooperate with members of Congress, government officials and the public in furnishing information. He stressed that this included proper presentation of facts to citizens and local groups on matters of policy and organization that might affect the Corps' work. "However," he warned, "no actions should be taken which could be construed as 'lobbying'."⁵⁵

Carrying out this directive, Division Engineer General Don G. Shingler met with one task force member, in March 1955, at McNary Dam, traveling on to The Dalles. Whatever Shingler's personal and professional feelings were about the new emphasis on private water resource development and the Hoover Commission, he reported to the Chief of Engineers, "Mr. Shannon seemed most favorably impressed with all he saw and seemed particularly glad to see that we were cooperating fully with the various public and private power agencies in their preliminary explorations in the field and partnership projects." Mr. Shannon's good impressions

apparently corresponded with those of Pacific Northwest residents. Upon release of the Hoover Commission's report on water resources in summer of 1955, the new Division Engineer Colonel Louis Foote informed General Sturgis that lack of public reaction to the fairly accurate and complete press coverage indicated general indifference. He added that although editorial comments criticized proposals for increasing power or navigation costs, very little had appeared in the press either supporting or denouncing the Commission's recommendations.⁵⁶

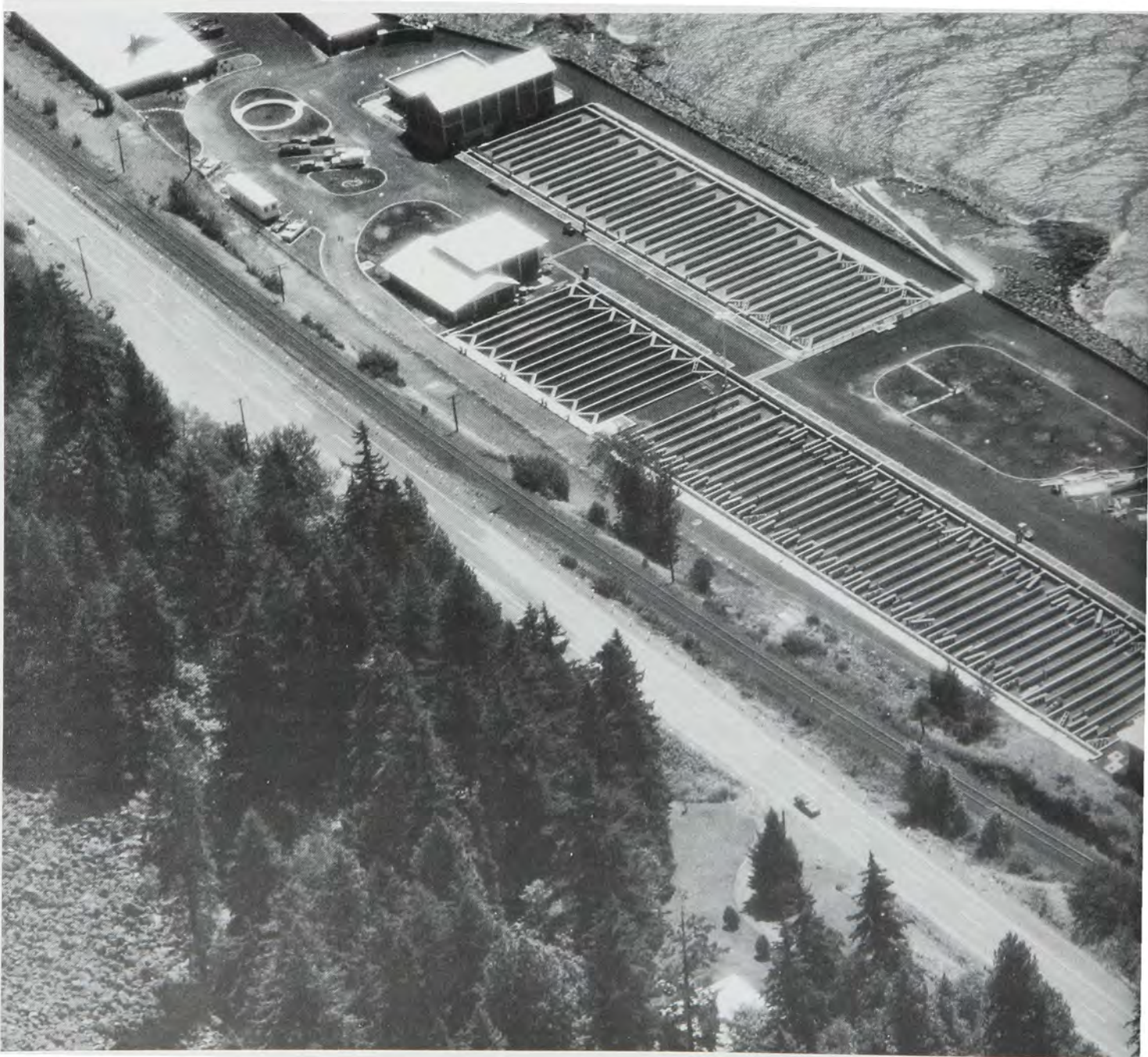
The new Eisenhower Administration, which had formed the task force, adopted the partnership policy by which the federal government would work with states, local communities and private citizens in reducing their dependency on the government. Under the partnership concept the Federal Government would fund non-reimbursable costs such as flood control and navigation, and private or public utilities would provide funds for and receive the benefits of the developed power. As Eisenhower explained in his State of the Union Message on January 1953, the partnership policy would advance the development of the great river valleys and the power they could generate. In carrying out the new policy, the Administration pursued a program calling for no new starts in river basin development, fewer regulations of private utilities, adopting a less favorable position toward preference for public bodies and cooperatives, and reducing federal initiation toward resource development. In the Pacific Northwest where the Corps' main control plan awaited implementation, the effects of the partnership policy promised to be far-reaching.⁵⁷

CHAPTER 9. ENDNOTES

1. U.S. Congress, House Document, 531, "Columbia River and Tributaries," 81st Cong., 2nd sess., 1950, hereafter cited as House Document 531.
2. House Document 190, pp. 4-5.
3. Lt. Col. Moore to Division Engineer, 24 July 1941; Park to Chief's Office, 1 Aug. 1941, Seattle FARC, Portland District Records, 77-82-006, "Lower Snake River," Box 4; Acting Secretary of Interior E. K. Burlew to Mansfield, 8 Oct. 1941; Secretary of War to Mansfield, 14 Oct. 1941; and, Smith to Secretary of War, 22 Oct. 1941, RG 77, NA, 111, 7249/436/1, /438, and /438/1.
4. Preston, *Walla Walla District History*, Vol. 1, p. 30.
5. Lt. Col. Northrup to Pacific Division Engineer, 8 Feb. 1944; W. W. Johnston to Portland District Engineer, 8 Feb. 1945, Seattle FARC, Portland District Records, 77-82-0060, "Lower Snake River," and "Snake River, General," respectively, Box 4.
6. Ickes to Stimson, 28 July 1944, Portland District Microfilm File, Box 591, File 2.
7. Stimson to Ickes, 23 Aug. 1944; Patterson to Fortas, 13 Oct. 1944; and, Ickes to Stimson, 26 Oct. 1944, *ibid.*
8. "Program for Columbia River Basin Problem Studies," 11 May 1944, *ibid.*, Box 597, File 1; Lt. Col. Tudor, Portland District Engineer, Pacific Division, 3 July 1945, *ibid.*, File 18.
9. Roy Scheufele, *History of the Columbia Basin Inter-Agency Committee*, n.d., pp. 22-28, copy in the Portland District Library, hereafter cited as *History of the CBIAC*. Scheufele, *History of the North Pacific Division*, pp. 24.
10. *Ibid.*, p. 35
11. Lewis to Chief of Engineering Division, 23 March 1944, Seattle FARC Portland District Records, 77-82-0060, "Lower Snake River," Box 4.
12. Lewis to Chief of Engineering Division, 16 May 1944, *ibid.*
13. Lewis to Section Heads, 3 July 1945, *ibid.*
14. MacDuffee to Chief Admin. Asst., 21 Aug. 1945, *ibid.*
15. These reports were prepared after a meeting of the representatives in Portland District Engineer Col. Walsh's office. Wire to Walsh, 18 Dec. 1945; Suomeal to Walsh, 11 Dec. 1946; Moore and Clark to Walsh, 6 Dec. 1945, *ibid.*, "Lower Snake, Fish Studies," Box 4.
16. McKinley, *Uncle Sam in the Pacific Northwest*, p. 99.
17. *Ibid.*, pp. 475-76; Scheufele, *History of the CBIAC*, pp.28-29; "The Corps of Engineers' Report on the Columbia Basin, Discussion," Robins papers, Ax 278, Box 1.
18. Murray Morgan, *The Columbia* (New York: American Book-Stratford Press, Inc., 1949), pp. 260-61; For a detailed description of the flood see Willingham, *Army Engineers and the Development of Oregon*, pp. 151-57.
19. McKinley, *Uncle Sam in the Pacific Northwest*, pp. 636-37.
20. *Ibid.*, p. 638.
21. House Document 531, pp. 41, 312-13.
22. *Ibid.*, p. 316.
23. *Ibid.*, pp. 306-08, 334-35.
24. *Ibid.*, pp. 308-09.
25. *Ibid.*, pp. 309, 336.
26. *Ibid.*, pp. 332-33. See Appendix Q, pp. 47-56 for a discussion of the legal aspects of Indian rights to inundated land and fishing sites.
27. *Ibid.*, p. 310.
28. *Ibid.*, pp. 317, 334.
29. *Ibid.*, pp. 330-31; C. L. Anderson, Director of Fisheries, State of Washington, in Board of Engineers, "Report of Testimony and Statements on Comprehensive Development of the Columbia River, Vol. 2," *Proceedings*, p. 325.
30. *The National Parks Magazine*, Oct.-Dec. 1948, reprinted in Hearings of the Board of Engineers, *ibid.*, p. 59.

31. House Document 531, pp. 17–20.
32. Portland District, “Columbia River and Its Tributaries Review Report, Interim Report No. 3, Hells Canyon Dam, Snake River,” 22 Dec. 1947, copy in Portland District Library.
33. Arthur J. Farmer, Portland Chamber of Commerce to W. D. B. Dodson, 17 Jan. 1947; L. A. Stevenson, Tacoma Chamber of Commerce to Farmer, Lord and Hagie of the Portland, Spokane and Seattle Chambers of Commerce respectively, Dodson papers, “Correspondence,” Ax 488.
34. Robins to Fred Inkster, Portland Chamber of Commerce, 10 Oct. 1947; paper by Robins, “The Corps of Engineers’ Report on the Columbia Basin,” ca 1949; state of Robins to the Portland Labor Management Committee, 2 Feb. 1949, in Robins papers, “Corps of Engineers, Columbia River Basin,” Ax 278, Box 1.
35. Joint Memoranda, 7 Dec. 1948, included as “Exhibit C” in Office of the Chief of Engineers, “Columbia River Basin, Report to the President’s Water Resources Policy Commission,” 1950; Scheufele, *History of the CBLAC*, p. 34. The Pick–Sloan Act was named for Colonel Lewis A. Pick, Division Engineer, Missouri River Division and William H. Sloan, Assistant Director, Region 6, Bureau of Reclamation, whose respective plans for Federal water policy in the Missouri Basin were combined into a joint agency report that resulted in the 1944 Flood Control Act.
36. *Ibid.*, p. 33–36.
37. McKinley, *Uncle Sam in the Pacific Northwest*, pp. 639–42; Scheufele, *History of the North Pacific Division*, pp. 25–26.
38. U.S. Army Corps of Engineers, Columbia River Basin: Report to the President’s Water Resources Policy Commission (Washington, D.C.: Office of Chief of Engineers, 1950), copy in Portland District Library.
39. McKinley, *Uncle Sam in the Pacific Northwest*, pp. 543, 550–53.
40. *Ibid.*, pp. 553–56.
41. Dodson to Farmer, 4 Feb. 1945, Dodson papers, “General Incoming Correspondence,” Ax 488.
42. Dodson to Representative Lowell Stockman, 20 March 1948, *ibid.*
43. Robins, “Development of Our Natural Resources,” Portland, Oregon, n.d., Robins papers, Ax 278.
44. Scheufele, *History of the North Pacific Division*, pp. 29–31.
45. Leaflet, “Read for Yourself what CVA Means,” n.d., NPD, RHA, “Executive Office Files,” Box 1.
46. Krug to Truman, 20 July 1949, in U.S. Congress, House Document 473, “The Columbia River. Final Letters of Transmission,” Feb. 1940, 81st Cong., 2nd sess., pp. 12–13. Krug expressed his support of Truman’s CVA proposal in his letter to Maj. Gen. Lewis A. Pick, 16 June 1949, reprinted in House Document 531, pp. xxvii–ix.
47. *Ibid.*, pp. 3–4.
48. *Ibid.*, pp. 326–37, 329–330.
49. Allan A. Smith to Marshall Dana, Chairman, Basin Development Committee, National Reclamation Association, 7 July 1950, Dana papers, Ax 21, Box 1
50. Arthur Maass, *Muddy Waters: The Army Engineers and the Nation’s Rivers* (Cambridge: Harvard University Press, 1951), pp. 133, 207.
51. Scheufele, *History of the North Pacific Division*, p. 31.
52. Text of letters of Truman and Royall included with letter of Royall to Frank Pace, Bureau of the Budget, 11 March 1949, NPD, RHA, “Executive Office Files,” Box 1.
53. The Commission on Organization of the Executive Branch of the Government, Department of Interior, “Report to Congress,” March 1949, p. 56, quoted in McKinley, *Uncle Sam in the Pacific Northwest*, p. 655; Report from the Chief of Engineers Office, “Corps of Engineers Functions and the National Interest,” Vol. 2, April 1953; Gen. Sturgis to Division Engineer, 19 Aug. 1953; Frank Pace, Secretary of Army to Rep. William Dawson, Committee on Expenditures, 5 June 1952, NPD, RHA, “Executive Offices Files,” Box 1; Pendleton *East Oregonian*, 26 Nov. 1948.
54. Roy F. Bessey, *Pacific Northwest Regional Planning*, pp. 79–84.
55. Sturgis to Division Engineer, 19 Aug. 1953, NPD, RHA, “Executive Office Files,” Box 1.
56. Foote to Sturgis, 12 July 1955, Sturgis papers.
57. President Dwight D. Eisenhower, State of the Union Message to the Congress, Jan. 1953, quoted in Bessey, *Pacific Northwest Regional Planning*, p. 85.

X AN ERA OF CONSTRUCTION, NEW ISSUES AND PROBLEMS



We seek a broad plan of development in the public interest . . . The requirements are as varied as the individuals and the conflicts of interests are more normal than abnormal. In our study and plan we will attempt to reconcile some of the major conflicts of interest we frequently find that a substantial degree of "co-existence" is entirely possible. However, I will not be foolhardy enough to predict how successful we may be in this element of our work.

General Louis Foote,
1956



The enlarged Spring Creek Hatchery in 1973.

1. Introduction

The decades of the 1950s and 1960s witnessed an increased in the complexity of issues surrounding water resources development in the Pacific Northwest. The partnership policy of the Eisenhower Administration which encouraged private development, clashed with regional interests who supported continued federal development of large water resources projects. The conflict was most noticeable in the middle Snake River area where federal construction agencies and private utility companies investigated and supported their own projects. Conservationists and sportsmen intensified the undercurrent of opposing dams and obstruction of free-flowing rivers. As in the past, the question of how much of the Columbia River system should be developed was complex, cutting across interest groups and regions. However, most people accepted the necessity of developing hydropower immediately. In April 1951 the Division outlined a long-range program for The Dalles, Ice Harbor on the Lower Snake, Hells Canyon on the middle Snake, and Libby on the Kootenai in Montana, pronouncing them sound, economical, engineering projects. Various interests opposed each one, and for different reasons. The fisheries people rejected The Dalles and Ice Harbor but favored Libby and Hells Canyon, while Hells Canyon stirred criticism among those who backed private development.

The Division believed that the region as a whole recognized the need for power but disagreed on the means and methods of obtaining it. Division Engineer Colonel Orville E. Walsh contended that construction of multiple purpose dams was proceeding too slowly for the region's welfare. In fact, the House Appropriations Committee cut \$800 million in 1951 from power projects in the Pacific Northwest.¹

The decades of the 1950s were influenced by the partnership policy and by Congressional struggles with the Administration which frequently vetoed water resources projects. This became a volatile political issue as Colonel Louis Foote, Walsh's successor in 1954, noted: "The frequency and violence of political campaign speeches on the subject of power development policy have reached new heights. The Corps is well out of the line of fire and I hope we will be able to maintain this position for the balance of the campaign period." Important as this was, issues of fish conservation and the environment affected the Division's policies and public relations as much as or more than the construction program. Other non-engineering problems had similar impacts, including treaty negotiations with Canada over Columbia River water, settlements with Indian tribes whose fishing sites were inundated, cultural resources and wildlife range threatened by the dams, and increased public interest in developing the reservoirs as attractive recreational areas. In contrast with the early years of simple wing dams, canals and locks, and even the construction of Bonneville Dam, the Division now had to respond to diverse social and cultural pressures. Consequently, it expanded its engineering base into biological, social, recreational and aesthetic areas. At the onset of this modern era of multiple-purpose planning, the Division enjoyed solid public support although in succeeding years it faced increasing criticism and turbulence. The new District Engineer at Walla Walla, Colonel Fremont S. Tandy, found a growing respect for the Corps and an increasing dependence on the agency for leadership and guidance. Chief of Engineers General Samuel Sturgis after a visit to the Division in 1953, also remarked on the superior reputation of the Division despite conflicting



Colonel Fremont S. Tandy, Walla Walla District Engineer, a proponent of comprehensive planning for the Snake River system.

attitudes toward developing hydropower in isolated wilderness areas. In his opinion, the North Pacific Division had the largest and the most sensitive civil works workload of any division within the Corps.²

2. The Partnership and Hydropower Development

The partnership concept of encouraging private development and thereby reducing federal involvement in hydropower projects caused little consternation within the Division. Congress defeated attempts to transfer large federal projects like John Day dam to private utilities for construction, and proposals to assist these utilities in funding multiple purpose projects through tax-free revenue bonds guaranteed by the Federal Government also failed. Officially, the Office of the Chief of Engineers supported the Administration's policy, although it cautioned that every project had to be decided on its own merits. The problem was how to come up with a conservative course of action that did not seem to favor the public power extremists on one hand or the private power industry on the other. General Sturgis wanted to avoid a passive, "middle-of-the-road policy" and warned against straddling the issues and playing it safe.³

In 1954 Chief of Engineers Brigadier General Emerson C. Itschner (Division Engineer from 1952 to 1953) explained the Corps' position on the partnership policy. Pointing to the increased awareness of the Corps' involvement in public works, Itschner emphasized that rivers should be viewed as hydrologic geographic units, and that many developments on these rivers required large financial investments that could not be returned quickly to private investors. Many projects were undertaken for the common public good and not to benefit a specific group or area. In view of the nation's need for power to insure continued national strength and prosperity, General Itschner cited the federal developments in the Columbia Basin as excellent examples of promoting industrial growth at minimum costs to the public. After describing the benefits of multiple purpose projects, Itschner emphasized that one of the foremost objectives of all Federal agencies involved in water resources was to develop a "better, sounder definition of the role of the Federal government with respect to other institutions, both

public and private, working in the same field." Itschner also foresaw that this policy could produce a "fuller, and certainly a quicker development of potential hydropower resources and the other related resources associated with them." Some of the measures being considered to encourage the cooperation included revenue bonds to finance the PUD undertaking at Priest Rapids, private ownership of power features at a multiple purpose project, and objective methods of allocating costs among different features of a multiple purpose project. In addition to these proposals, Itschner noted the Corps was reexamining its backlog of authorized projects. In the Pacific Northwest, these included potential sites along Hells Canyon and the Clearwater River Basin.⁴

It was these stretches of the Snake and Clearwater that perhaps invoked the most critical, unresolved issues in the region – fish versus dams; public versus private development; preservation versus development. In his last year as Chief, General Sturgis observed during an inspection of the Division that most people, except "dyed-in-the-wool" New Dealers, were against the Hells Canyon project as a federal, high dam. On the advice of Division Engineer General Itschner, Sturgis publicly declared that the Corps disclaimed any interest there except for flood control. Moreover, flood control could be obtained at upstream storage sites on the Snake or Clearwater in the event Idaho Power Company succeeded in acquiring a permit for a low power dam in Hells Canyon. Elsewhere, Sturgis noted, the Division engineers and contractors were occupied with construction at The Dalles, Chief Joseph and at McNary which was almost ready to begin producing power.⁵

Complying with the Chief's request for information on power projects that could be developed in conjunction with private industry, the Division produced a short report in 1956. Except for three low dams in Hells Canyon which the Federal Power Commission had approved for private development by the Idaho Power Company, the Division analyzed all its projects according to the partnership criteria. Simultaneously, Congress introduced legislation for partnership construction of Cougar and Green Peter dams on the Willamette and Rocky Reach and John Day on the Columbia. The legislation did not pass despite strong support from many Congressmen. However, the Division favored the legislation, and its 1956 report described the bills for Cougar and Green Peter as excellent examples of partnership proposals. The Secretary of the Army also recommended a partnership arrangement for Bruce Eddy on the Clearwater River which the Corps later built as Dworshak Dam. Overriding the concern of who would build new dams was the continued demand in the Pacific Northwest for more power and new construction, irrespective of whether or not one or more of the partnership proposals could be implemented. In fact, Congress allocated construction funds for Cougar, Hills Creek and Ice Harbor, and planning funds for Libby, Green Peter and John Day for fiscal year 1956 to allow the Division to begin these dams, again regardless of whether the projects were eventually built as a partnership venture or entirely by the Federal Government.⁶

The emphasis on rapid construction in the 1950s was also reflected in the next review of the Columbia River and tributaries. Undertaken strictly as an engineering and economic survey directed primarily at reappraising the overall plan and integrating the new sites investigated, it was not as innovative as its 1948 predecessor.⁷

While planning the new review, the Division became involved in an intensive survey of the middle Snake and its tributaries including the Clearwater and the confluence of the

Salmon River. As described previously, the Division had included these areas in its 1948 survey and report, recommending the Hells Canyon project for power and flood control and as an integral part of the main control plan for the Columbia River Basin. The Division also described the Nez Perce project just below the mouth of the Salmon River as the most desirable from an engineering standpoint because of its large storage capacity and hydropower potential. But because Nez Perce would block anadromous fish runs to spawning grounds in the Salmon and its tributaries, the Division advised against the project. It did consider numerous other projects on the Clearwater and Grande Ronde Rivers, recommending High Mountain Sheep on the Snake as an alternative to Nez Perce.⁸

In 1951 the Senate Public Works Committee requested an investigation of the middle Snake and tributaries in view of the partnership policy. Since most of the benefits would accrue to downstream federal dams, the Secretary of the Army advised that construction would not be financially profitable for a private concern without some type of federal financial participation. In conducting the survey, the Secretaries of the Army and Interior agreed to divide the territory, giving Interior the section of the Snake from above the mouth of the Salmon to the site of the proposed Hells Canyon Dam. The Walla Walla District conducted the investigation in cooperation with the Bureau's regional office. Division Engineer General Itschner assured Chief of Engineers General Sturgis in September 1953, "We are taking every precaution to assure that in the conduct of our own survey and preparation of our report the fullest cooperation is maintained and that no duplication is permitted." At a 1953 public meeting at Orofino, Idaho, Walla Walla District Engineer Colonel Tandy reassured the audience that complete coordination with the Bureau's regional office had been effected in a most outstanding manner without any duplication of efforts whatsoever. The Bureau's regional office presented its own recommendations at the hearings immediately after the Corps' presentation.⁹

The 1953 hearings at Orofino on development of the middle Snake attracted 500 people, and witnessed an increasing antagonism toward further hydropower projects, although Division Engineer General Don Shingler reported that the testimony of the over 75 individuals who gave statements was "predominantly favorable." While fish and wildlife groups protested, wildlife and outdoor organizations located in communities adjacent to the locations of the proposed dams expressed generally favorable reviews. Local residents saw the projects as a means of increasing the tax base, but Black Eagle, representative of the Nez Perce Indians raised a strong objection. He remarked that the Indians were losing their fishing and hunting areas, concluding "There is no measure to compensate them in any shape or manner."¹⁰

The hearings well illustrated the complexities of regional attitudes toward water resource development and preservation of natural resources. Colonel Tandy described, in some detail, the concern of the investigations regarding anadromous fish, and he outlined how the Walla Walla District had examined salmon and steelhead populations, consulted with fisheries people from state and federal agencies and industry, and then discussed the plan for fish mitigation. "We think we are quite well informed on the fishery problems of the Columbia River and its tributaries," he asserted. He explained that the Division had rejected, for the present, dams on the Salmon, Imnaha or Grande Ronde rivers or any streams blocking fish runs. In addition, it was recommending a fishery project as an

extension of the Lower Columbia Fisheries Development program.¹¹

Conservationists were divided on the issue of hydropower development. The Grangeville branch of the Idaho Wildlife Federation stated that general opinion in that area favored dams, although people wanted sufficient money allocated to conserve the natural resources affected by construction. The Idaho Outdoor Association seconded this recommendation with the observation that the general opinion greatly favored the dams. The representative of the Bonners Ferry Wildlife Federation, representing the extreme northern part of Idaho, appeared somewhat confused. He had attended the meeting in order to join the opposition, in case any existed, but he noted that such opposition seemed quite limited. Nonetheless he registered a whole-hearted protest against the proposed dams on the Clearwater and promised cooperation with local people in any efforts to preserve natural fish and wildlife areas.¹²

A high dam in Hells Canyon was the foremost issue at the hearing. The secretary of the Idaho-Oregon-Washington Hells Canyon Association objected to substituting smaller, private dams on the Clearwater for the larger federal projects the Association favored. Wishing to avoid debate over the controversial project, Tandy responded that the hearing was not a forum for Hells Canyon Dam . . . "or for public power 'for' or 'against' by any manner or means".¹³

The Orofino hearings gave no clear mandate to the Corps for developing streams within the rugged, wilderness of Idaho. Moreover, the issue of which agency would develop the water resources also remained unresolved. The Corps was not content with the territorial division as concluded in the April 1949 agreement with the Bureau of Reclamation. A June 1953 briefing statement from the Division Engineer to General Sturgis, listed this agreement as one of the problems within the Division which he hoped could soon be resolved. Itschner pointed out that the geographical distribution of multiple purpose projects restricted the Corps to those below Grand Coulee and the Snake below Ronde River. He recommended that efforts should be made to rescind the agreement as soon as possible and, with the consent of the Department of the Interior, to return to the previously established jurisdictions, placing flood control and navigation under the Corps and irrigation under the Bureau. Itschner added that the Interior Department also favored reversion to the basic division of water resource development.¹⁴

Redefining the Corps role in the upper and middle Snake River Basin raised another issue that vitally concerned the Walla Walla District. Oliver A. Lewis of the Walla Walla District's Planning Branch complained to General Sturgis that the Corps had done little planning in this region. He charged that the 1948 review report gave scant consideration to industrial and commercial development of the middle and upper portions of the basin, particularly to areas in southern and southeastern Idaho. Lewis's correspondence with Sturgis revealed a fear within the Division that the Corps would relinquish its interest in the irrigated Snake River Basin to the Bureau. He worried that a return to the Bureau-Corps divisional agreement would make "an extensive program by the Corps in the Snake River Basin impossible."¹⁵

Sturgis admitted that the 308 report did not adequately represent Idaho's interests. Nonetheless, the surveys had found that population and industrial growth in southern Idaho would continue to lag behind that of coastal areas and the central Columbia areas. Moreover, Idaho had waged a strong

fight to keep public power out. "We can take no part in such a struggle, and we are due no blame for it," he concluded.¹⁶

Public opinion in Idaho had indeed proven recalcitrant toward accepting federal assistance, including opposition to the Corps' Lucky Peak Dam for flood control on the Boise River. Commenting on an editorial in the Boise newspaper criticizing the Corps, Sturgis commented, "It would appear that Idaho interests should support such a project. But if Idaho doesn't support the one best project we have been able to develop for her benefit, how can they blame us for being slow to recommend others which, so far, have appeared less favorable."¹⁷

During the next decades, Congress funded flood control and reclamation projects in the upper Snake Basin, and Idaho Power built three small power dams in Hells Canyon. Downstream on the Clearwater, only Dworshak (initially called Bruce Eddy) found support as a large federal dam. It was finally completed in 1971. The Division's other proposed project at Penny Cliffs on the Clearwater and the Bureau's Pleasant Valley and Mountain Sheep dams on the Snake found no support locally or in Congress. Not only did outside interests object to large dams at these sites, opinions within the Corps differed as to their merits. The most outspoken critic of large federal projects on the middle Snake and other rivers was Colonel "Terrible Tom" Tandy, Walla Walla District Engineer. On the occasion of his retirement, Tandy summoned reporters to his office and spoke candidly of the Corps' multiple-purpose plans. He criticized the lack of a comprehensive study on the Snake dam sites and advocated flood control storage on the upper Snake instead of the middle Columbia. His criticism of the lack of a comprehensive plan for the middle Snake - "Only by 'good luck or the grace of God' can engineers choose the proper site for a dam without such a survey" - and his remarks that there were at least six dam sites above Weiser that were preferable to any in Hells Canyon challenged the Bureau of Reclamation's recent proposals for Pleasant Valley and Mountain Sheep. The Chief's office deplored the bad taste of this public criticism of the Bureau, especially just after the publication of the joint report on the Columbia. It pointed out that the Corps had spent \$5 million in 1948 for the review Tandy had criticized, and the Division Engineer and the Chief's Civil Works Branch had just approved \$200,000 for a survey of the area.¹⁸

Tandy's remarks to the press indicated that not every Corps officer approved the agency's direction in multiple purpose planning in the Pacific Northwest. Claiming that the Federal Government's foremost responsibility lay primarily in navigation and flood control, he advocated completing John Day, Ice Harbor and the next three dams on the lower Snake as the logical steps toward creating seaports out of cities in the Inland Empire. He recommended that the government stay out of the power development field, except where power benefits were incidental to navigation and flood control, and he advocated a larger role for states and local interests as part of the partnership policy. Perhaps the most controversial remarks were those directed toward fish conservation. Tandy rapped the Division's proposed high dam at Priest Rapids as detrimental to salmon runs up the Okanogan and unnecessary for flood control. Describing fish preservation as a fundamental concept, Tandy stressed that the fishing industry was of prime economic importance to the region and no high storage dams should be constructed on downstream sites.¹⁹

The partnership policy, fiscal conservatism and objections from fishery and wildlife groups temporarily slowed the Corps' construction program outlined in the 1948 main control plan. Soon after the completion of the Hells Canyon joint report, however, the Senate Committee on Public Works in 1955 requested a review of the main control plan particularly in regard to flood control storage and the possibility of using Canadian waters for that storage through a cooperative agreement. The Senate Committee also asked the Division to consider navigation and hydroelectric power as part of a hydrothermal system, all related water uses, modifications of Bonneville Lock and Dam, installation of navigation locks at Priest Rapids private power project, and other modifications on the upper Columbia River.²⁰

The impending review of the Columbia River system in 1955 also reinvigorated the Inland Empire Waterways Association which had been waiting impatiently for appropriations for Ice Harbor, the first of the four lower Snake River dams. Although Congress authorized the project in 1945, the administration placed a freeze on the funds which lasted until 1956. In the interim, the Association continued lobbying for Brucers Eddy and for planning funds for John Day and Lower Monumental. Division Engineer Louis Foote appointed the energetic Herbert West of the Waterways Association to a general advisory committee to assist in the preparation of the "308" review report. West expressed confidence that the review would bring the whole regional development plan back into focus in terms of need for upstream storage and downstream power production.²¹

While the review was in process, General Foote outlined the status of the Division's water resource programs in the mid-1950s. He remarked that upstream storage, a keystone in the main control plan of 1948, was being eroded because of Interior's strenuous objections to the Glacier View project near Glacier National Park in Montana. The inability to reach agreement with the Canadian government was delaying plans for another large, multiple-purpose storage project at Libby, Montana. In addition, the construction of dams at Priest Rapids and in Hells Canyon by private utility companies meant drastic reductions in storage capacities proposed by the Division in the main control plan. Foote estimated that the loss of high dams with their larger impoundments had reduced storage at Priest Rapids to less than one-fourth of the proposed 2.1 million acre feet, and on the middle Snake to less than half of the proposed 3.28 million acre feet. Further, Congress had decided to reduce John Day storage as a cost-saving measure. These changes would reduce projected storage from 27 million acre feet to one-half million. In order to compensate for the loss of storage and meet anticipated demands for more power, the 1955 review examined other feasible sites. The Corps had already recommended Brucers Eddy and Penny Cliffs to Congress in June 1955, but there were few alternatives to upstream storage. Increasing the pools behind dams on the middle Columbia and extending levees or seawalls would be neither practical nor economical. Of the 23 new sites identified as possible storage projects in the 1955 review, none were ever completed as federal projects. Moreover, one of them, the proposed Nez Perce project just below the mouth of the Salmon River, intensified the struggle of conservation groups to preserve upstream spawning grounds for anadromous fish.²²

3. Fish and Wildlife Conservation

Of all the issues surrounding the Corps of Engineers in the Pacific Northwest, that of fish conservation has been the most controversial and most damaging to the Corps' image among conservation, wildlife and sports groups. In the late 19th and early 20th centuries, the Division's primary role had been regulating fishing boats and apparatus in the interests of navigation. Before the construction of Bonneville Dam, major threats to fish runs were overfishing, obstructed streams, and pollution. At first, fish hatcheries appeared to be a solution to declining fish populations. In 1885 the U.S. Commissioner of Fisheries declared that the fish culturist would be able to produce plentiful supplies of fish at much less cost than the cost of enforcing protection laws. Beginning with the Clackamas fish hatchery in 1877, Oregon constructed several hatcheries on rivers tributary to the Willamette and Columbia. By the 1930s, it was apparent that hatchery production could not keep pace with fish losses from industrial and municipal pollution, open irrigation ditches, obstructions at the mouth of spawning streams, dams, and most important according to the 1937 report of the U.S. Commissioner of Fisheries, unregulated and unrestricted fishing. "These are all requirements which have little, if anything, to do with artificial propagation," the report concluded, "and cannot be managed by hatcheries." The report warned that ignoring the requirements for conserving fish runs would doom the Columbia salmon fishery to extinction no matter how much money was spent on hatcheries.²³

The authorization of Bonneville Dam and plans for a series of dams on the Columbia, the lower Snake, and the Willamette River and its tributaries, focused attention on the fish resources of the Pacific Northwest. Although the Division did not ignore the problem of passing fish over Bonneville, it had not investigated it in depth before the 1930s. Under pressure to produce an engineering design for a fish passage system at Bonneville, fishery agencies and the Division became increasingly aware of the effect their plans and facilities would have on the survival of the anadromous fish.

Many of those concerned with fish runs were pleased with Bonneville's success when the dam was permanently closed in 1938. In June of that year, the Interior Department released a statement describing how the chinook salmon climbed the fish ladders with "far less effort than their forebearers that fought upstream through the swirling rapids that are now buried beneath fifty feet of water." J. D. Ross, the BPA Administrator, confidently reported that over 30,000 fish climbed the ladders in May, proving that the dam was not a barrier. The Oregon Fish Commission and fishermen agreed that the salmon were saved and the fishways were a "howling success." The Division took great pride in this accomplishment. Colonel Robins claimed the fish ladders were by far the largest and best ever built or proposed.²⁴

The Bureau of Fisheries also applauded Bonneville but remained uneasy over the prospect of additional dams that would be built. In 1937 the Bureau stated that the capacity of the fishways had been planned with a considerable margin of safety and that the operation was highly flexible. It further remarked that it appeared that every possibility of failure or successful operation had been foreseen and provided for in the



The fish ladder, left; and the modern Visitor's Center at Bonneville Dam.

system. However, each additional dam would create delays as the fish searched for the entrances to the ladders. They would become exhausted and possibly unable to spawn. Some biologists feared that the dead water above the dams would also deter migration. In all events, experts believed Bonneville would provide a useful index of the effect of one large power dam on salmon populations.²⁵

When Senator McNary advocated splitting responsibilities for managing Bonneville between the Corps and a proposed Columbia River Administrator, the Chief's Office cited the Bonneville fish passage system as an argument against this change. Chief of Engineers General G. B. Pillsbury contended that "neither this Department nor any other agency will be in a position to assure the preservation of the highly important salmon fishery on the Columbia River unless it has full and complete control of the operation of the dam." Pillsbury added that this change would be a palpable waste of public funds.²⁶

In winning the battle for control of Bonneville operations, the Corps assumed responsibility for fish passage at this and other dams. Although fish counts indicated the success of Bonneville, the Division and fishery interests worried about further development. In the 1935 review report, Colonel Robins explained that fishery interests did not oppose development per se, but they wished to delay additional projects until the effects of Grand Coulee and Bonneville were known. He warned that if commercial and sport fishing were to survive on the Columbia, adequate facilities to insure fish passage over dams must be provided. Noting that fishery interest opposed a high dam at The Dalles, he advised that such a project would create an insurmountable barrier to fish and destroy all upstream salmon fishing. In that event, hatcheries and facilities for removing all the fish below the dam would be necessary to insure salmon fishing downstream from the project.²⁷

Conservation groups amplified Robins' warnings about the harmful effects of high dams on fish runs. William L. Finley of the American Nature Association complained to President

Roosevelt in 1938 that artificial propagation could not replace migratory fish runs destroyed by high dams on the Columbia and Willamette rivers. Finley criticized pending Congressional legislation for seven high dams on the Willamette which had not received the backing of many Oregon state agencies. The Chief's Office responded with assurances that it had carefully considered the conservation of wildlife so far as possible in terms of legal provisions. He had worked closely with the Department of Agriculture and the Bureau of Fisheries "in order to insure that maximum benefits to the public may be derived therefrom." The goal was a balance between giving every attention to fishery protection and the need to harmonize those interests with flood control, navigation and other uses of the river.²⁸

The Oregon State Planning Board agreed with this harmonizing perspective, explaining in its 1938 publication *Oregon Looks Ahead*, that true conservation meant balanced growth through adjustment of conflicting interests. It suggested that certain lakes and streams could be reserved for recreation, fish and wildlife while others could be developed for agricultural and economic uses. This recommendation meant confining development to specific areas which the State Planning Board cautiously refrained from identifying.²⁹

A few years later in 1941, the House Committee on Rivers and Harbors requested General Thomas Robins to testify again on the status of migratory fish and dams in the Pacific Northwest. The Congressmen pressing for approval of Columbia and Snake River dams greatly appreciated Robins' positive statements that fish runs upstream at Bonneville had been the largest in 30 years and that fish had experienced no difficulty in ascending the ladders. Oregon Representative Homer Angell, a native of The Dalles, enthusiastically interjected a description of his recent visit to Bonneville where "the fish took to the ladders like a duck does to water." Angell optimistically reported that the engineers had "solved the problem." Turning to Robins he asked, "Is it true that the fishery industry seems to be well satisfied with the result?" Robins responded, "Yes sir. Even the Indians have come to it. They have announced that there are just as many fish, if not

more, since the dam was built." Then referring to the last fish festival at The Dalles, Robins remarked that the Indians invited white people to the celebration. "They have buried the hatchet," he asserted.³⁰

Robins also testified to the ability of the downstream migrating fingerlings to safely pass the dams. Using a popular and colorful image, he claimed a mule could go safely downstream through the turbines, if it could be kept from drowning. Current experiments seemingly had proven conclusively that the turbines were absolutely incapable of hurting the fish. Unfortunately for the fish, experience would prove him wrong. After a few more questions Robins concluded, "We have done all that could be done to take care of fish. If they disappear it will be because of civilization and not because of the dam."³¹

The construction of other main stem dams, beginning with McNary in 1945, threatened the survival of the migratory salmon. As it prepared its second major review of the Columbia River and tributaries in the mid-1940s, the Division acknowledged that contingency plans were necessary. In a cooperative effort, the Corps and the Bureau of Reclamation provided funds to the U.S. Fish and Wildlife Service for the Lower Columbia River Fishery Program. This program would salvage and conserve the most valuable strains of salmon; if upstream salvage operations failed, the fish could be transplanted downstream, thus preserving and improving these runs. The plan included measures advocated in 1937 such as removing obstructions on tributaries where salmon spawned and greatly expanding propagation through construction of new hatcheries.³²

Other agencies initiated stronger action. In October 1946, the Fish and Wildlife Service attempted to obtain a moratorium on the lower river plan by lodging a protest with the Department of Interior with support from the Office of Indian Affairs. The Interior Department's newly established Pacific Northwest Coordination Committee invited the Bonneville Power Administration and the Bureau of Reclamation to comment on the protest. The report outlined genuine conflicts of development versus conservation, and it confirmed the danger to the salmon runs. It further warned of the probability of greater losses at high dams and the cumulative effect of all the dams on salmon. The Office of Indian Affairs specifically protested the drowning of the Indian's ancient fishing grounds at Celilo Falls in violation of the 1855 treaties. The National Park Service added its protest that the dams would probably destroy recreational activities on the middle and upper Columbia and the Snake. Although it advocated the pressing need for additional generating facilities at the proposed dams, the Bonneville Power Administration joined the other agencies of the Interior Department in recommending the final report. This report advised deferring new projects at The Dalles and the lower Snake and authorizing dams on the upper tributaries and at Hells Canyon in their place. It also sought funds for salmon research, compensation for inundated fishing sites, and adopting both an immediate and long-term policy for river development.³³

While the report was being forwarded to the Federal Interagency River Basin Committee and then back to the Columbia Basin Interagency Committee (CBIAC), news of the contents leaked to regional groups opposed to a moratorium. The CBIAC, under its chairman Colonel Theron Weaver, Division Engineer, scheduled a meeting for late June 1947 at Walla Walla. The selection of this site aroused controversy among opponents of the dams because the city is located 500

miles from the center of the salmon industry at the mouth of the Columbia, and it was traditionally the nucleus of support for slack water development.³⁴

Over 200 people attended the Walla Walla meeting, including a good number of conservationists. The next month, the CBIAC held a closed executive session under its new Chairman, Robert Newell of the Bureau of Reclamation. The members decided to modify the Interior's report, based on their objection to rescheduling authorized dams on the middle Columbia and lower Snake. The CBIAC also recommended compensating Indians for fishing grounds instead of substituting other areas for their exclusive use. Some concluded that this change in attitude among Bonneville Power Administration and Bureau representatives who voted for the modifications revealed a basic flaw in the agency representation. The Committee members were from the region and were liable to be influenced by pro-development pressures. Others believed the modifications resulted from a diligent review of all testimony and available facts, as well as additional discussions with several experts.³⁵

After prolonged discussion, the CBIAC finally agreed that the record did not justify the proposed moratorium. The Division stated that definite conclusions could not be reached because of the numerous variables, "because so many uncertainties exist, and because the development of the river for other needed purposes cannot be delayed indefinitely until all fisheries problems in connection with dams are solved." After the moratorium was defeated, the Division proposed its own plan in conjunction with the Fish and Wildlife Service. Under this plan, the Service would develop fish runs to the highest possible levels of productivity on the lower Columbia River in order to either preserve valuable salmon species if the fish passages failed upstream, or to augment the current salmon industry. This was known as the Lower Columbia River Fishery Program, and the Corps contributed funds and data, and recommended the program to Congress in its 1948 review. In the review report, the Division recognized that even by integrating various fish facilities into its proposed projects, a succession of dams would cause significant cumulative losses between the ocean and the spawning streams. Therefore, it recommended funding the program at an estimated cost of \$20 million for two, six-year periods. The first period would be spent in research and intensive construction of hatcheries. In the second phase, the government would construct fish ladders at natural falls, remove obstructions at the mouth of spawning streams, screen irrigation ditches, and reduce pollution. The Division also warned that the program would be fully effective only with assistance from the states and by preventing private and municipal encroachment upon spawning grounds. On the whole, the prognosis for the salmon runs appeared hopeful in the Division's 1948 report, and it foresaw that creation of large bodies of slack water would meet expanding recreation needs and increase wildlife habitat.³⁶

The 1948 review also considered fish and wildlife conservation on the Willamette system. It found that salmon runs and populations of other fish had also declined here, in particular chinook which had been depleted by overfishing and pollution. For the immediate future, the Division foresaw a continued decline of these runs even with the hatcheries, but it believed the new multiple purpose projects would benefit fish by regulating stream flow. The trade-offs would be the blockage of some tributary streams and the loss of wetlands for migratory waterfowl in the winter. Not everyone agreed with this tradeoff. Fishery interests vigorously opposed the popular

support for flood protection of valuable farmlands and to a lesser extent support for power, navigation, irrigation and recreational development around reservoirs. Centering their protests on the main stem of the middle fork of the Willamette, the McKenzie and South Santiam rivers, they requested that proposed projects be relocated on the tributaries so that migratory fish could reach spawning areas. The concentrated efforts by sport fishermen, resort owners and other recreational users succeeded in forcing the Division to substitute three smaller projects on the McKenzie tributaries for the one large dam which had been authorized.³⁷

The Federal Government also took an active interest in preserving the salmon runs. In the 1950s, the Truman Administration authorized an investigation of the nation's water resources that included a review of fish and wildlife. This group of independent experts, the President's Water Resources Policy Commission, expressed a guarded optimism about the survival of anadromous fish. The Commission strongly recommended deferring construction of downstream dams to give agencies time to collect data and possibly develop a means of harmonizing maximum power production with fish conservation. "It is possible," the Commission remarked, "that we have only begun to realize the capacities of scientific fishery management for increasing the abundance of migratory fish in waters which are certain to remain accessible to them." In balancing fish conservation with the economic needs of the region, the Commission unequivocally stated that accessibility of migratory fish to every stream could not be considered wholly essential. Although it believed in preserving fishery resource as long as possible, it emphasized water resource decisions should be based on the relative contribution of conservation and development to regional and national well-being.³⁸

Despite the Division's concern with the conservation of anadromous fish in the 1940s and 1950s, it paid considerably less attention to the possible effects of new dams on fish runs – either for commercial or conservation purposes – than development of hydropower, flood control, and the important military construction programs in Alaska. At this time, the prognosis for fish survival was good. Division Engineer General Emerson C. Itschner reported to General Sturgis in 1953 that fish runs over Bonneville in 1952 set a record of over 875,000 fish. The Division also hoped that raising the pool behind the new dam at The Dalles would augment fish runs by drowning Celilo Falls. Itschner noted the considerable sums of \$7.5 million expended at Bonneville and an estimated \$27 million at The Dalles for the fish passage facilities, and he praised the engineering fishery research program which would protect fisheries at "maximum efficiency at minimum cost." He further stated that although fish ladders had proven successful for upstream migrants, the ten percent estimated losses of downstream fingerling migrations would necessitate a major research effort. A total of \$1.5 million would fund such a program which, Itschner confidently reported, could be completed in five years at the most.³⁹

The next "308" review on the Columbia River and Tributaries completed in 1958 and published in 1962 gave considerable attention to fish and wildlife. It included data on fish counts at Bonneville, Rock Island and McNary dams, and it described in detail the two fisheries programs in the Pacific Northwest: the U.S. Fish and Wildlife Service's Lower Columbia River Program to which the Corps had contributed \$18.5 million through fiscal year 1957; and the Division's own Fisheries Engineering Research Program initiated in 1951 and

funded with \$2.5 million. The report revealed what earlier figures and reports had overlooked, namely the loss of downstream migrants that did not pass as easily through the turbines as Colonel Robins' had confidently claimed in 1941 with his example of the hypothetical mule with an air tank swimming safely through the dam. Although upstream migrations continued to show an overall success rate when compared to figures for 1938, the first year such data was collected, downstream migration appeared to be considerably less successful. Even though devices for protecting downstream migrants were not as advanced as those for the mature adults swimming upstream, the Division expressed its confidence in 1955 that attraction, collection and diversion apparatuses would provide a safe downstream passage. Relying on studies begun in 1951 under the fishery engineering program, the Division recommended extending the program. The Chief agreed, stressing that until the fish passage problem was solved, the timely and orderly development of water resources projects to meet the economic needs of the basin would be delayed. An obvious example was the Nez Perce project which possessed optimum development features but would intercept 40 percent of anadromous fish passing over McNary on the middle Columbia. Neither the Division nor the Chief's Office wished to undertake the Nez Perce project until adequate fish passage facilities could be designed. The Division noted that its proposal for this dam had aroused more concerted opposition than any other because of the feared impact on fish migrations. Despite support from various pro-development groups, the Division refused to officially recommend it. In seeking other opinions on the proposed dam, the Chief of Engineers requested the Bureau of Reclamation's advice. The Bureau responded that it might take scientists and engineers from 15 to 20 years to solve the complicated and unique fish problems at the site. The Division consequently omitted the Nez Perce project from the list of 12 recommended for the Columbia River Basin.⁴⁰

Testimony at a series of public hearings held in July 1956 at Missoula, Spokane, Lewiston and Portland, reflected the primary interests in water resources at each site. Opinions from each regional center differed as to priorities assigned to navigation, power, irrigation and flood control, but there was unanimity among fishery, wildlife and recreation interests about protecting these values. Nonetheless, the Division concluded that its program was favorably received, and that all agencies and other interested organizations had acknowledged the report as an example of sound, unbiased planning. It also stressed that project studies should thoroughly consider recreation potential, enhancement and preservation needs of fish and wildlife resources.⁴¹

Two years after the 1958 local hearings Congress amended the 1946 Fish and Wildlife Coordination Act, directing that fish and wildlife conservation should be considered equally with all other project purposes and coordinated with other features of water resource development programs. Under this legislation, the Corps could evaluate both adverse and beneficial effects on fish and wildlife in its planning stages and recommend project alterations or land acquisition to conserve these resources. Further, the Corps was to continue coordinating its plans and project developments with the Fish and Wildlife Service, the National Marine Fisheries Service, and other affected state agencies. The Act also authorized a study of the lower Snake River in view of fish and wildlife compensation. The resulting study, which constituted a major research effort in the Division, was not released until the early

1970s. It represented an interagency effort by the Fish and Wildlife Service, the U.S. Bureau of Sport Fisheries and Wildlife, and fish and game agencies in Idaho, Oregon and Washington. The Corps financed the separate reports that went into the final study, and hearings and an environmental impact statement in 1975 completed the process.⁴²

The 1958 act also marked an important redirection in the Division toward full participation in fish and wildlife research and compensation. The Division had been involved in fish research since the cooperative planning efforts at Bonneville Dam in the 1930s, but it was considered more an adjunct to water resources development than an official part of the Division's programs. The 1945 authorization for the lower Snake River project had not included fish research, compensation or mitigation measures. Moreover, projects authorized before the 1958 act did not have to meet any mitigation standards. With the 1958 legislation and the nation's increased sensitivity toward fish and wildlife, the Division gave more attention to downstream passage of fingerlings and hatchery construction. For example, in 1959 the Walla Walla District initiated a research program on passage of fingerlings through test turbines, continuing this research over the next six years at various low head and high head dams. In these tests, fingerlings were marked and their survival rates were estimated.⁴³

Despite research efforts, the continued mortality of downstream migrants frustrated both state and federal agencies. Division biologist Edward M. Mains commented in 1964 that the safe passage of these juvenile fish through reservoirs and past dams remained the major unresolved problem in making water development projects and anadromous fish runs compatible. The data proved this pessimism was well founded as the number of salmon and steelhead caught above the last upstream Snake River dam decreased from 59,000 in 1957 to 26,000 in 1964. Although the runs stabilized in the next decade, the problem of increasing them to their former levels remained.⁴⁴

With a regional consensus that mitigation and improved passage facilities were essential, cooperative programs for research and operation of hatcheries among the various states and agencies became essential. The frustrated editor of the Portland *Oregonian*, an avid supporter of fisheries, remarked in 1965, "Isn't it time that the states and agencies get off their political fannies and admit that the ocean-going fish are regional resources and give up some of their sovereignty to an interstate compact?" The CBIAC echoed the request for immediate action that same year. Its Fisheries Subcommittee requested support for several proposals. These included the preservation of natural fish habitat on small watersheds; cooperation with Canada; continuation of research on fish passage, artificial propagation and management; reduction or discontinuance of using Columbia River water for nuclear power plants; and the retention of the Columbia River Fishery Development Program. The CBIAC subsequently approved the recommendations of its sub-committee, but it was not empowered to implement any of the proposals.⁴⁵

In the debate over measures and means to preserve the fish runs, the Division became a major factor in fish hatchery funding and construction. This was part of the Corps' responsibility for fish mitigation, but unfortunately the 1958 Fish and Wildlife Coordination Act had not made clear the lines of responsibility between the Corps and the Fish and Wildlife Service. This ambiguity in the language of the Act led to a lively debate between the two agencies over the law's

intent. The Corps interpreted it as meaning that the Corps was obligated only for those fish hatcheries built as an integral part of the project. The Fish and Wildlife Service maintained that the Corps was also obligated to construct all hatcheries necessary to mitigate fish losses. It further protested that it had neither authority nor funds for hatchery construction. Although a policy was proposed in 1965 whereby the Corps would mitigate the cost of hatchery construction, the problems of how to evaluate damages to fish and wildlife and allocate hatchery funds for the Fish and Wildlife Service remained unresolved.⁴⁶

The Corps' intense dam building program in the first half of the 1960s explains much of the tension behind the negotiations between the two agencies. In that period, the Division had six major dams under construction or nearing completion on the Columbia and Snake rivers, including three of the four lower Snake River dams, and the large dam on the Clearwater (Dworshak) which was authorized for construction. In anticipating fish losses and responding to public pressure, the Division enlarged two existing fish hatcheries at Spring Creek, Washington, in the Columbia River Gorge and the Bonneville hatchery, at a cost of about \$15 million. The hatchery at Dworshak assumed a special significance as the decision was made not to build fish passage facilities at the high dam but instead rely on a hatchery to compensate for the loss of migrating fish. By 1966 the Division was operating three fish hatcheries with its own funds, and it was involved in various stages of planning and designing for four others including the Dworshak hatchery. It was thought this hatchery might become the largest in the world. Whether or not the Division was satisfied with its involvement in fish hatcheries, it realized the importance of settling the matter of which agency should budget for operation and maintenance funds. Although the Division would have preferred to not have this responsibility, it concluded that it was essential that some decision be made in time to include the funds in the project budget. Unless this was done, either fish losses would be sustained or filling of the reservoir would be delayed. The projects in question were Green Peter, John Day and the dam proposed for the Rogue River.⁴⁷

While the question of hatcheries was being decided, the Division established amicable relationships with fish and wildlife agencies and conservationists, partly as a result of Chief of Engineers General William Cassidy's personal efforts toward improving relations. Even so, the Division and its districts were cautious in releasing information on the recommended fish and wildlife measures to be included at project expense. The Division attributed this policy to past conservative Corps policy on such matters and the lack of policy guidance on the new liberal approach.

Although conservation of anadromous fish commanded wider public attention, the problems of wildlife compensation were also important in the mid-1960s. During these years, the Division was in the midst of planning for the acquisition of 7,500 acres of land at the Libby Dam site, and it had recommended 5,000 acres at Dworshak. Wildlife mitigation, unlike fish mitigation, evoked public controversy because it meant transfer of land from private owners, often reluctant to sell, to government agencies. Such withdrawals of land from private ownership also meant a loss of state land taxes and enlargement of already sizable federal land holdings in the western states. In view of extreme local opposition, the Division recommended that the Corps, the Fish and Wildlife Service, the Bureau of Land Management and the Forest



Pouring the main yard of concrete at Libby Dam.

Service come to an agreement at a departmental level on priority use of existing federal lands for wildlife mitigation. It recommended acquiring private lands only if no other alternative were available.⁴⁸

Another problem appearing in the late 1960s posed an even greater threat to the fish runs than the dams. This was water supersaturated with nitrogen that killed large numbers of fish around the Columbia and Snake River dams in the late 1960s and early 1970s. The condition is caused by air that becomes entrapped in water that spills with great force over the dams into the deep pools below. Because the river current is slow in these places, the entrapped gases in the water cannot escape as would happen in swifter flowing streams. The super-saturated water causes the "gas bubble" disease in fish similar to the bends suffered by deep sea divers. The dead fish have blisters on their mouths and fins and ruptured eyes. The fish that do survive are more susceptible to predators and infections. Although nitrogen supersaturation had long been a chronic problem in fish hatcheries, only in 1965 did a Washington State biologist report that it was occurring in the slack water below Columbia and Snake dams. As more dams were brought on line, the situation became more serious. Fish kills at the newly completed John Day Dam in the late 1960s prompted harsh criticism of the Corps and the dams.⁴⁹

The initial problem at John Day appeared to be disruption of migration when the pool behind the dam was filled, and not supersaturated water. After taking a few days to adjust the fishway entrance and attraction devices, the Division reported that the spring chinook run had been successful. Then during high seasonal flood flows in June and July, an aerial survey revealed 86 dead chinook and sockeye salmon, and a later investigation discovered other fish in an exhausted condition below the dam. Subsequent examinations by Division and Fish and Wildlife service scientists identified the cause as nitrogen supersaturation in the water causing gas embolism or bubbles in fish tissue and circulatory systems. The Division claimed that the problem was due to an abnormally high spill at John Day and that with more power units on line in the next few years the problem should

disappear. It further reported that counts of sockeye salmon were above average and fall migrations upstream past John Day totaled around 16,500 fish per day. Conservationists hotly disputed the Division's interpretation of the events, charging it had closed John Day before the fish ladders were operational. Even when the ladders were put in use, only 279 chinook passed over the dam during the first two days, although 12,397 chinook had been counted passing the ladders at Bonneville during a three-day period. The alleged death of hundreds of salmon that summer forced state agencies to temporarily suspend the fishing season. According to conservationist Oral Bullard, the release of contradictory statements by Washington, Oregon and the Division on the numbers of migrating fish created suspicion, resentment and uneasiness among the public.⁵⁰

The full implications of multiple dams for the survival of the Pacific salmon and steelhead were still in the future. Yet in 1968, the Division remained optimistic. It announced in a briefing prepared for a representative from the Chief's Office, "Thus, while we had some serious problems, largely of a non-recurring nature, we do not agree that the fish runs are doomed."⁵¹

4. Canadian Water and the International Joint Commission

In the 1940s, the Corps of Engineers realized that the comprehensive development of the Columbia River system could neither be planned nor undertaken without including the Columbia watershed in Canada. The 1948 floods painfully illustrated the need for cooperation in flood storage. The subsequent extended negotiations between the two nations came to fruition with a treaty signing ceremony in 1964. President Lyndon B. Johnson and Prime Minister Lester Pearson meeting at the Peace Arch in Blaine, Washington, completed a process that began in 1909 with the Boundary Waters Treaty. This treaty gave citizens of each nation equal water rights and privileges in United States or Canadian courts,

and it created the International Joint Commission to oversee this policy. Despite the agreement, the first comprehensive reviews of the Columbia and its tributaries did not include the Canadian portion of the Columbia or Kootenai Rivers in its scope, primarily because flood control through storage reservoirs was not yet accepted as an important benefit of river development. Yet there was some interest in the 1930s to include Canada in plans for the Columbia system. John H. Lewis, Oregon's State Engineer and a prime mover in shaping Oregon's water laws, urged President Hoover in 1930 to endorse the Columbia River Basin as a component of a national program of major water improvements. Part of the plan for developing the river system, Lewis explained, was storage in Canadian lakes. He suggested negotiating a new treaty immediately as much valuable time had already been lost.⁵²

Although Colonel Lukesh did not include Canadian storage in his 1931 report, the next review of the Columbia and Snake rivers published in 1938 did. Colonel Robins proposed Canadian storage as an alternative to a large storage dam at The Dalles. Although Robins' description of the suggested projects in Canada were predominately technical and based on limited data, he did stress the importance of an international agreement. Despite the many practical difficulties in obtaining flowage rights and storage from Canada, Robins claimed these would be less difficult to handle than the extraordinary problems created by a large reservoir behind The Dalles.⁵³

Interest in closer cooperation between the United States and Canada emerged during World War II. The two countries formed Joint Economic Committees which in turn created a North Pacific Planning Project. A second important effort was the survey of a trans-Canada-Alaska military railroad, followed by a survey and construction of the Alaska-Canada highway from Fort St. John in British Columbia to Fairbanks. The extent of the Canadian-Alaska corridor and its lack of population convinced both nations on the practicality of investigating joint economic problems. Through the National Resources Planning Board, the United States began preliminary studies of cooperative efforts in transportation, fisheries, agriculture, economics and trade. Although Congress's abolition of the Planning Board in 1943 terminated this cooperation, the Canadians continued their part of the study.⁵⁴

The next year Canada and the United States asked the International Joint Commission to study the possibility of the cooperative development of the Columbia. This request resulted in the formation of the International Columbia River Engineering Board which labored diligently during the next few years, producing its report in 1959. In the interim, the United States' interest increased in using Columbia headwater storage for new multiple purpose projects, especially after the record floods of 1948. The Division's main control plan of 1948 estimated that the total amount of main stem and tributary storage in Canada excluding Arrow Lakes was 26.76 million acre feet.⁵⁵

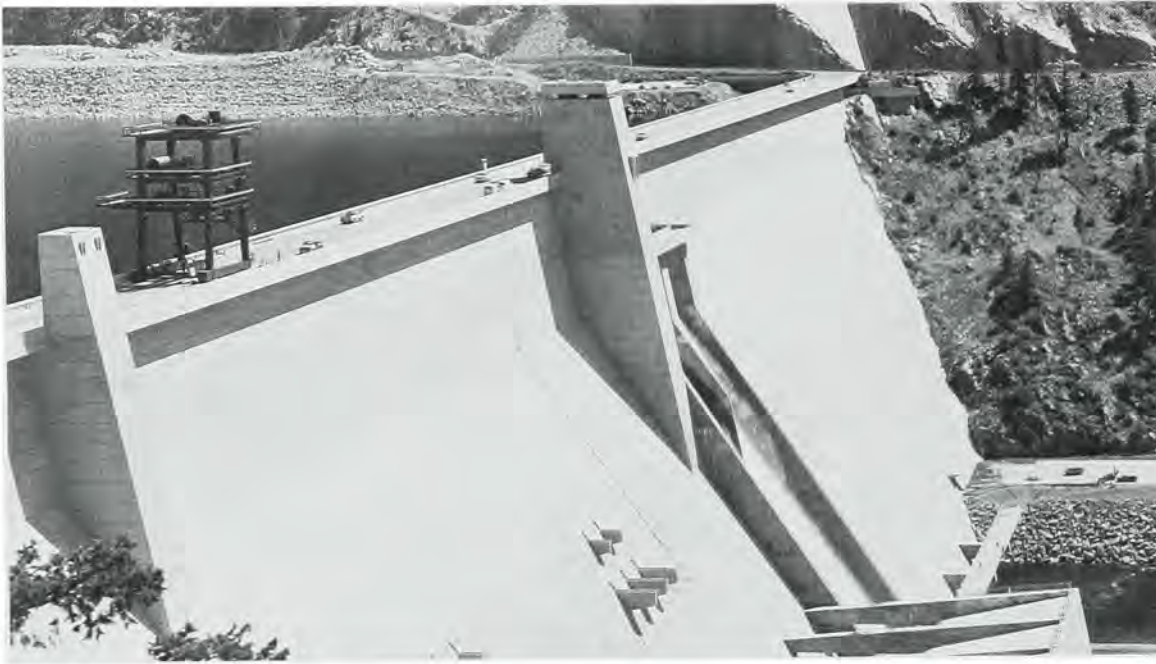
The Division's interest in cooperative development with Canada in this period centered on the Libby, Montana, project. The main control plan developed in the 1948 review proposed this project on the Kootenai River, eleven miles above the town of Libby for flood control and power. The dam would produce 244,000 kilowatts of prime power, and owing to the northward meandering loop of the river, the Libby project would provide water for hydropower production at Canadian

dams as well. Furthermore, the project would aid the local economy. At a hearing at Libby in July 1948, United States and Canadian residents of the Kootenai Valley testified that most area residents favored the construction of a multiple purpose project, even though some local businessmen objected to it. That same month the International Joint Commission held a second hearing attended by officials of both countries. Troubled by the 1948 floods, the Commission approved a statement supporting the Libby project as prepared by the International Columbia River Engineering Board.⁵⁶

Many others on both sides of the border supported Libby and other projects on the Columbia headwaters. The Kootenai Valley Associated Drainage Districts suggested undertaking the project with the least possible delay, without investigating the Canadian portion of the Columbia River watershed. Governor Douglas McKay of Oregon, Governor Len Jordan of Idaho, the Bureau of Reclamation, the Spokane Chamber of Commerce, and the Pacific Northwest Utilities Conference Committee sent similar messages to the International Joint Commission in 1951. Although the Libby Chamber of Commerce expressed its uneasiness over the Corps' lack of provisions to compensate the community for damages to its logging and mining economy, it, too, forwarded a favorable statement recognizing the national benefits of the dam.⁵⁷

Of all the issues involved in constructing Libby Dam, the treaty negotiations with Canada proved the most difficult. Much of western Canada generally favored a treaty that would give them a share of power revenues, but the Canadian government, in an assertion of economic nationalism, proved reluctant to sign a treaty granting some of its water rights to the United States. In the mid-1950s, the situation became truly alarming when the Canadians announced a plan to divert surplus water from the Kootenai to the Columbia at Canal Flats and from there to transport the water to the Fraser River through a tunnel. The diversion of water from its natural course in the Columbia system would have disastrous effects on the Libby project, the Kootenai, and other billion dollar dams and power facilities already constructed. Len Jordan and Douglas McKay, successive chairmen of the United States section of the International Joint Commission, argued against Canada's plan. In April 1954, Division Engineer General Shingler advised Chief of Engineers General Sturgis of the Pacific Northwest's anxiety. Aware of the serious negotiating problems ahead, Sturgis advised maintaining a sense of balance to avoid being forced politically to accept the exorbitant requirements of the Canadians. In the meantime, he counseled pursuing the proposed dams on the Clearwater, Brucers Eddy and Penny Cliffs to demonstrate the Corps' ability to "go ahead with power and flood control in the event the Canadians try to make it too tough for us."⁵⁸

As British Columbia explored ways of developing its hydropower resources, the Corps worried about private agreements between British Columbia and other federal agencies that would exclude the North Pacific Division as a full partner. In October 1954, Kaiser Aluminum and British Columbia concluded an agreement to develop storage sites on Canada's Arrow Lakes, and Kaiser and the Bonneville Power Administration began initial negotiations for delivery of additional power produced by releasing storage waters from Arrow Lakes. Under this agreement, Canada would issue a license to Kaiser for constructing and operating the project in exchange for a portion of the generated power. Puget Sound



Libby Dam with the Treaty Tower in the center.



Sculpture on the north side of the Treaty Tower at Libby Dam.

Utilities forwarded a similar proposal in November for a project at Mica Creek, a tributary of the upper Columbia.⁶⁰

In 1960 the two countries resumed direct negotiations. With the unified and strong leadership of Pacific Northwest Congressional delegations, Congress in January 1961 approved the Columbia River Treaty. Espousing the principle of international cooperation, the treaty affirmed that "many more advantages at much less cost would flow from joint development and control than from two competing and often conflicting operations." Under this agreement, Canada would

build three dams with a total of 15.5 million acre feet of storage, primarily for flood control and power in the United States. In return for these benefits, Canada was to receive a share of the increased power production resulting from the storage and one-half of the value of reduced flood damages in the United States. The treaty also approved a transboundary storage project at Libby that would extend 42 miles into British Columbia.⁶⁰

President Eisenhower and Prime Minister John Diefenbaker registered the 1961 treaty with the United Nations in January 1961, and the Senate and President John Kennedy ratified it in March. Two years later in January 1963, Kennedy and Prime Minister Lester Pearson signed clarifying agreements, but the Canadian Government refused to ratify the treaty because of a jurisdictional dispute with British Columbia. The dispute was settled in January 1964, and Lyndon Johnson signed the proclamation of the final treaty in September. During these negotiations, Division Engineer General William W. Lapsley, whom Johnson had appointed to be the United States entity along with BPA Administrator Don Hodel, joined an advisory committee to work out administrative and technical details. Lapsley had been a signatory to the agreements signed in 1961, 1962 and 1963. The BPA and the Corps assisted in negotiating the final terms of sale which amounted to a settlement of about \$305 million plus \$64 million for the value of food control. As an adjunct to the treaty, a consortium of public power entities and federal agencies operating hydroelectric projects in the Columbia Basin formed the Columbia Storage Power Exchange Corporation in order to ensure an equitable distribution of power from Canadian storage.⁶¹

With the long 20-year treaty process completed, the Division proceeded with plans to construct the Montana dam. Although the site was comparatively isolated, the reservoir would seriously disrupt the local economy by cutting off roads and the railroad line used to haul logs to the lumber mill at Libby. The community of Libby, dependent on an annual payroll of \$4 million from logging, had protested to the Corps in 1951 that the government had made no provisions to

The Visitor Center
at Libby Dam,
1975.



reimburse the city, county or state for reconstructing the road and railway. Further, the project included no plans to compensate the local county for loss of revenue during the initial construction or to give the county and state an equitable share of the power sales. Aside from these economic concerns, Libby town officials voiced concerns about the social and economic disruptions arising from an influx of construction workers. The problems of maintaining city services for a booming population were not new. The construction of Grand Coulee and Bonneville had created hastily fabricated workers' camps with attendant social and health problems. In the 1950s and 1960s, however, expectations and responsibilities were different. Arlington, Oregon, near the site of John Day dam, provided an example of appropriate planning for rapid population growth and loss of property. The Division had held hearings and restudied the proposed pool elevation, recommending the lower one favored by local residents. When it was established that the final pool level would inundate the town's business section, the Corps became the primary agent in relocating houses, purchasing property, and working with the town planning commission to design a new business district on a fill above the reservoir. Construction of a small boat harbor, an outer harbor with wheat elevators and a marina for larger boats, and a modern shopping district in 1969 portended a vigorous tourist and business future for the remodeled town on the new interstate highway.⁶²

Libby posed a different problem. Tourism was less important to the town's economy and relocation of structures, including a railway tunnel, more difficult. Town officials and the Chamber of Commerce foresaw no appreciable benefits from the dam, only loss of revenues and need for more administrative, emergency and social services for the expected 2,000 construction workers and their families. New roads and bridges were needed, and existing school facilities and staffs would have to be enlarged and new schools built. Fortunately for Libby and communities facing similar disruptions to their schools, Congress had passed legislation authorizing financial assistance to local education agencies. After 1951 the Federal

Security Agency and not the Corps handled these financial arrangements.⁶³

The actual construction of the dam at Libby began 15 years after Congress first authorized the project and two years after the final treaty with Canada was signed. At the beginning of the project, the Division encountered resistance to acquiring land from property owners in the reservoir area. Some objected to using the lower 1955 land prices that did not reflect inflated values in 1966; others protested the government's acquisition of private land for recreation, fish and wildlife. While recognizing the sensitive nature of land acquisition, the Division's real estate office firmly defended the government's rights and maintained that the public in the majority of cases had accepted the established policies and procedures.⁶⁴

Despite criticism of the dam, arrangements for relocating the nearby town of Rexford and expanding school facilities proceeded relatively smoothly. The costs of relocating roads, railroads and utilities amounted to nearly half the cost of building the dam itself, and they were in addition to those accrued for acquiring reservoir land and expanding schools. The situation clearly illustrated some major problems of building dams in the modern age.⁶⁵

The Libby project highlighted other emerging issues: recreation and aesthetics. The first visitor center and landscaping was at Bonneville Dam, but the Division initially discouraged visitors. Then when the dam proved popular with the public, Portland District officially opened it to visitation in 1938, and in 1949 it built a visitor's center, six years after completing the project. In the early 1940s, the District planted extensive rose gardens which extended from the project houses to the guard house. Although the landscaping and rose garden became a well-known attraction at Bonneville, elsewhere the spartan appearance of dams built during the 1950s reflected a policy of austerity introduced during the Eisenhower Administration. Land acquisition around projects was kept to a minimum, and the amenities of landscaping and visitor facilities were minimal or simply absent.⁶⁶



Recreation at Lucky Peak dam and reservoir on the Boise River in southern Idaho.

Libby Dam was to be an exception to the austerity policy, primarily because of its international position and the anticipated number of visitors from Canada, the United States, and other countries attracted to the region by nearby national parks and recreational areas. The Division selected the nationally known architect Paul Thiry as its consultant. Thiry's initial design integrated the structure into its natural environment, and his final plan included the dam site, its surroundings, and a three and one-half mile stretch of the Kootenai River downstream. The architectural design sought to integrate dam, powerhouse and visitor facilities with each other and with the environment. The Seattle District worked with an architectural board of review in formulating the completed plan which included visitor viewing areas both outside and within the structure.⁶⁷

An important public benefit that had been recognized in building the Willamette Valley dams was increased recreational opportunities at reservoir sites such as marinas, picnic spots and trails. The Libby project offered viewing points, a visitors center, recreational areas along the reservoir bank, a bridge across the stilling basin, and a Treaty Tower on the crest of the dam commemorating the international nature of the project. The dam was dedicated in 1975, three years after the three Canadian dams included in the international treaty – Duncan River, Arrow and Mica – had been completed.

In many ways Libby represented the Corps' expanding responsibilities in social and economic planning and its commitment to recreational and aesthetic values. But other issues remained to be scrutinized, namely, the construction and operation of fish hatcheries to mitigate losses from dam projects and the increased opposition to disturbing the environment. The refusal of several Canadian officials, including Prime Minister Trudeau, to attend the dedication-revealed Canadian displeasure over flooding wildlife habitat and provisions for power sales. The latter point was particularly worrisome to the United States in the mid-1970s because of the energy shortage and Canadian threats to cut off oil and natural gas exports into Montana. Although this threat did not materialize, it did focus attention on the precious commodity of hydroelectricity and the need for enduring

cooperation between the two countries sharing this water resource.⁶⁸

5. Recreation: Transition to a New Age of Water Resource Uses

Libby Dam was but one example of the Division's increasing involvement in the field of water resource development and management. The Flood Control Act of 1944 authorized the Chief of Engineers to construct, maintain, and operate public park and recreation facilities and to grant leases. The Division developed facilities at Fern Ridge and Cottage Grove in 1949–50, but the Korean War and defense priorities usurped funds from recreational development. Nonetheless, the Division had progressed in creating water recreational sites in the Pacific Northwest. These efforts attracted tourists and impressed the presidential commission on water resources with the Corps' serious commitment in this area. The 1950s witnessed widespread public interest in recreation due to increased leisure time, paid vacations, and access to private automobiles and good roads. In 1959, one year after Congress passed the Outdoor Recreation Resources Review Act, the North Pacific Division received funds to develop recreational facilities at McNary, Lucky Peak, Fern Ridge, Lookout Point and Dorena. In October 1962, the Division created the position of recreation coordinator in response to the Administration's emphasis on recreation and to heavy public use of Corps reservoirs. The Division subsequently revised its master plans for all existing reservoirs to provide for upgrading established and future facilities and to acquire supplemental land for recreation at sites where funds previously had been lacking. In addition, it improved its planning and rating procedures for determining recreational values.⁶⁹

A 1962 amendment to the basic 1944 legislation widened the Corps' authority to enhance public recreation by insuring ready and free access to water and shoreline facilities. The Corps interpreted this to mean acquisition of private land if necessary, an action that raised considerable controversy at



Recreation on the Willamette river, and at Big Eddy, Dworshak reservoir, Clearwater River in northern Idaho.



Libby Dam. This was also a departure from the former policy of obtaining only the minimum land needed for a project. The Chief's Office defended land purchase at Libby on the grounds that the recreational plan was much more than a narrow road terminating at the water's edge. Proper access included sufficient parking, health and sanitary facilities, and boat ramps as necessary for the public's enjoyment of the reservoir. The passage of the Federal Water Project Act in 1965 reinforced this interpretation by specifying that recreational development should be given equal consideration with other benefits. The Act also encouraged non-federal management of recreational developments through cost-sharing arrangements.⁷⁰

Division Engineer General Peter G. Hyzer supported the Chief's position on visitor's facilities. Assuring General Cassidy that his staff and the districts were well aware of the need for adequate facilities and beautification, he outlined several problems arising from recreational planning. Besides receiving criticism for private land acquisition, the Division had to work out cooperative arrangements with the Bureau of Land Management on the use and supervision of lands designated for water-related projects. Under policies established in 1962 between the two agencies, the Corps acquired the land below the height of the flood control pool plus 300 vertical feet of freeboard. Faced with the prospect of withdrawing substantial amounts of land at existing and potential reservoir projects, the Corps by 1966 found itself restricted by local Bureau of Land Management officials who wished to retain control of new and previously withdrawn public land. While the Bureau of Land Management argued it should have responsibility for these lands, the Division just as vigorously supported the view that it could do a more effective job.⁷¹

A more serious problem in the late 1960s and early 1970s was lack of funds to carry out the Chief's directives on strengthening Corps activities in recreation and environmental areas. In July 1969, Division Engineer General Roy S. Kelly decried the effects of reduced funds on maintaining a vigorous and on-going recreation program. Under cutbacks slated for 1970 and 1971, the Division faced the need to defer recreation and visitor facilities at new projects. Moreover, Kelley feared that local interests would lose faith in the Division's efforts to

maintain an aggressive conservation-minded image. A cutback would also mean more costly crash programs to accommodate public recreation needs in the future. Funding problems continued into the early 1970s, straining relations with local governments that had agreed to participate in the Division's programs and with the public users of prime recreation areas, such as John Day, Little Goose, Green Peter and Foster dams. Kelley reiterated to the Chief his opinion that the public was suspicious of the Corps' professed concern for the environment. Delay in completing recreation programs, he charged, would result in "site deterioration and management problems."⁷²

One of the major reasons for public displeasure with the Corps' lag in developing recreational facilities was the unexpected popularity of Corps sites for recreationists. In fact, visitation to these sites increased from 30 million in 1952 to over 400 million in 1977, making Corps projects more heavily used than those of other federal agencies. Unfortunately, some agencies and private groups realized they could not maintain these sites under the cost-sharing agreements authorized by the 1965 Water Project Recreation Act. The Walla Walla District, which had numerous projects with attractive features along the Columbia, Snake, Clearwater and Boise Rivers, found that counties which had promised to operate and maintain sites developed by the Corps now could not afford the expense. Consequently, it became responsible for several small parks at dispersed locations that were more difficult to manage and expand than previously experienced at their fewer and more concentrated recreational areas. In 1971 the Forest Service announced it had no funds for recreational development at Libby Dam where 300,000 visitors were anticipated each year.⁷³

Another related problem was upgrading, rehabilitating and expanding existing recreational sites. In 1970 the Division estimated this work would cost \$20 million. Preparing plans for such activities in cooperation with local organizations had led to the unfortunate situation of the public questioning the Division's intentions when proposed plans were not funded. In view of increased visitation at these popular recreational sites, in 1972 the Division instituted a review by a multi-discipline

task group to develop goals and priorities. In that year, Division Engineer General Kenneth T. Sawyer reported an expenditure of \$1.5 million on recreation and a capability of spending \$7 million in fiscal year 1972.⁷⁴

The Division's investment in recreation signified an important transition in modern lifestyles of increased leisure and widespread use of pleasure boats and camping equipment. These needs competed with more traditional uses of water resources for navigation, power and flood control. On the other hand, environmental programs increased public interest in, and criticism of, the Division's activities. In 1968 General Cassidy instigated a survey throughout the agency that included recreation administration as one of the ten areas most needing improvement. A summary of responses from the divisions revealed the sensitive nature of programs and policies in this area. One respondent commented that because

recreation provided the greatest point of contact with the public, it was here that the Corps' image could be greatly enhanced or severely damaged, depending on policies and quality of service. "If we are to stay in the recreation business," the writer continued, "we must develop and staff our facilities adequately and provide sufficient funds with sound policy guidance to insure quality service to the public." The alternative would be an accumulation of problems and adverse publicity that possibly could drive the Corps from the water resources field. This statement was particularly applicable to the North Pacific Division where boaters, hikers, fishermen and picnickers had come to depend on easily accessible sites for their recreation, especially in the arid country along the Columbia and Snake. Recreationists represented a new pressure group within a coalition of commercial and sports fishermen and environmentalists that would help shape the direction of the North Pacific Division in the coming decades.⁷⁵

CHAPTER 10. ENDNOTES

1. Peterson to Walsh, 5 April 1951, Robins papers, Ax 278, Box 1; Tacoma *Times News*, 27 June 1951.
2. Tandy to Sturgis, 6 July 1953; Sturgis to Itschner, 9 July 1953; Sturgis to Foote, 27 Dec. 1955, Sturgis papers.
3. Sturgis to Shingler, 15 Dec. 1953, *ibid.*
4. Emerson C. Itschner, "The Corps of Engineers in Water Resource Development," *Military Engineer* 46:311 (May-June 1954), pp. 169-72.
5. "Notes on North Pacific Division Inspection, June 27-July 4," 14 July 1953, Sturgis papers.
6. "Multiple-Purpose Projects in the Pacific Northwest," with memorandum from Itschner to Sturgis, 9 Aug. 1955, *ibid.*
7. *Ibid.*, p. 3.
8. House Document 531, pp. 215-21; Roy F. Bessey, *The Public Issues of Middle Snake River Development: The Controversy over Hells Canyon and Nez Perce Reaches*, State of Washington, Division of Power Resources, *Bulletin No. 9*. (Olympia, 1964), p. 52.
9. U.S. Congress, Senate Document 51, "Middle Snake River, Snake River and Tributaries, Wyoming, Idaho, Oregon and Washington," 84th Cong., 1st sess., 1955, pp. v, 34, 58; Itschner to Sturgis, 16 Sept. 1953, Sturgis papers; U.S. Army Corps of Engineers, Walla Walla District, "Public Hearings, Columbia River and Tributaries, Middle Snake River Basin," Part I, Appendix 5, Orofino, Idaho, 20 Nov. 1953, p. 8. Hereafter cited as Orofino Hearings, 1953.
10. *Ibid.*, pp. 78, 93, 97-100, 123, 190-91.
11. *Ibid.*, pp. 11-16.
12. *Ibid.*, pp. 78, 93, 106-107.
13. *Ibid.*, pp. 117-125.
14. Briefing, "Activities and Problems of NPD to Major General Sturgis, 29 June 1953," Sturgis papers.
15. Lewis to Sturgis, 19 Aug. 1953, Sturgis. Lewis's letter was written about the same time Itschner remarked to Sturgis that the Division was severely restricted by the April 1949 agreement and that many were increasingly worried that federal development in the Pacific Northwest would stop unless additional planning was done immediately. See, "Activities and Problems of the NPD," 29 June 1953, *ibid.*
16. Sturgis to Lewis, 5 Nov. 1953, *ibid.*
17. *Ibid.*
18. Portland *Oregonian*, 3 Aug. 1954.
19. *Ibid.*; Whipple to Sturgis, 6 Aug. 1954, Sturgis papers.
20. U.S. Congress, House Document 403, "Columbia River and Tributaries," 87th Cong., 2nd sess., 1962, pp. 1-4. Hereafter cited as House Document 403.
21. *The Log*, 7:8 (Oct. 1955). This was a periodical published by the Inland Empire Waterways Association at Walla Walla. Copy with Sturgis papers. Also, Sturgis to Baker, President of IEWA, 2 Nov. 1955, Sturgis papers.
22. "Information Bulletin on a Study of Water Resource Development of the Columbia River Basin," n.d. This bulletin outlined the objectives of the review authorized in 1955, and it was probably produced by the North Pacific Division. Copy in the Seattle District Service Branch Files under "Columbia River and Tributaries." House Document 531, Table VI-I, p. VI-7.
23. U.S. Congress, Senate Document 87, "Report of the Commissioner of Fisheries," 75th Cong., 1st sess., p. 59. Hereafter cited as Senate Document 87.
24. U.S. Department of the Interior, "Press Release for Sunday, June 19, 1938," McNary papers, "Bonneville," Box 37.
25. Senate Document 87, pp. 41, 51.
26. Pillsbury to McNary, 11 June 1937, McNary papers, "Bonneville," Box 37.
27. U.S. Congress, House Document 704, "Columbia and Snake Rivers, Oregon, Washington and Idaho," 75th Cong., 3rd sess., pp. 25, 35.
28. Finley to Roosevelt, 11 June 1938; Snow to Finley, 6 July 1938, RG 77, NA, 111, 7249/385.

29. Oregon State Planning Board, *Oregon Looks Ahead*, 1938, p. 52.
30. U.S. Congress, House Committee on Rivers and Harbors, "Hearings on the Improvement of the Snake River, Oregon, Washington and Idaho," 77th Cong., 1st sess., 22 Sept. 1941, pp. 14-17.
31. Ibid.
32. McKinley, *Uncle Sam in the Pacific Northwest*, pp. 386-87.
33. Ibid, pp. 429-30.
34. Ibid, pp. 429-31, 473-75.
35. Ibid, p. 474; Scheufele, *History of the CBIAC*, pp. 25-27, Scheufele, *History of the North Pacific Division*, p. 24; House Document 531, pp. 97-98.
36. House Document 531, pp. 65, 97-97, 128-29, 177.
37. Ibid, pp. 234, 240, 252; President's Water Resources Policy Commission, *Ten Rivers in America's Future*, Vol. 2 (Washington D.C.: U.S. Government Printing Office, 1950), pp. 45-46.
38. Ibid, pp. 14-15, pp. 45-58.
39. For a comparison of the relative importance of anadromous fish issue see reports and correspondence between the Division and the Chief's Office from 1953 to 1956 in the Sturgis papers. Information on the public's relative disinterest in fish conservation is in Gordon Merritt, *Prelude to Slackwater*, p. 56. Itschner, "Activities and Problems of NPD," 29 June 1953, Sturgis papers.
40. House Document 403, "Report by the Division Engineer," 1958, pp. 97-97; "Report of the Chief of Engineers," 1961, pp. 14, 18; and, "Report of the Board of Engineers for Rivers and Harbors," 1959, pp 22-23.
41. "Progress Report on Columbia River Comprehensive Review Report, 15 Aug. 1956," Seattle District Service Branch Files, "Columbia River and Tributaries," NFS 800.92/289.
42. U.S. Army, Office of the Chief of Engineers, *Digest of Water Resources Policies and Authorities*, Pamphlet No. 1165-2-1 (Washington, D.C.: Office of the Chief of Engineers, 1979), p. 18-1; Beatrice Holmes, *A History of Federal Water Resources Programs, 1800-1960*, Miscellaneous Publication No. 1233 (Washington, D.C.: USDA Economic Research Service, 1972), p. 31. The final report on the lower Snake River was published by the Walla Walla District as *Special Report: Lower Snake River Fish and Wildlife Compensation Plan*, 1975. For information on the report also see Preston, *History of the Walla Walla District*, Vol. 1, pp. 259-60; Vol. 2, pp. 65-66; and Schubert, "From the Potomac to the Columbia," p. 88.
43. Preston, *A History of the Walla Walla District*, Vol. 1, p. 117
44. ARCE 1964, p. xxxii.
45. Scheufele, *History of the CBIAC*, pp. 115-19.
46. "Notes prepared for Division and District Engineers Conference, 26-28 Oct. 1965," Copy at Seattle FARC, NPD Record Holding Area, 72 A1094, 16902, 77(1), 204-45, 1964-67. Hereafter, Division Engineers Conferences, 1964-76.
47. Ibid. Division Engineer General Hyzer also advised the Chief in 1966 that the Bureau of the Budget should make an immediate decision as to which federal agency should budget for operation and maintenance funds. See, Hyzer to Cassidy, 29 April and 29 July 1966, NPD Quarterly Reports.
48. "Notes Prepared for Division Engineers Conference, 12-13 Oct. 1966." Division Engineers Conferences, 1964-1967.
49. For information on the nitrogen supersaturation problem, see L. Edward Perry, "Supersaturated Nitrogen, Columbia River," presented at a hearing of the U.S. House of Representatives, Public Works Committee on Nitrogen Supersaturation Problems in the Columbia and Snake Rivers, 6 May 1972, p. 7; Carl Elling and Wesley Ebel, *Nitrogen Supersaturation in the Columbia and Snake Rivers - A Disaster or Blessing in Disguise?* (Seattle: Northwest Fisheries Center, 1973); John A. Biggs, Washington State Director of Ecology, "Testimony Before Washington Legislative Interim Committee on Fisheries, Game and Game Fish," 24 June 1971, quoted in Martin Hevelmans, *The River Killers* (Harrisburg, Pennsylvania: Stackpole Books, 1974), p. 157. A summary based on the above sources is in Jameson, Petersen and Reed, *History of the Walla Walla District*, Vol. 3, pp. 84-86.
50. Oral Bullard, *Crisis on the Columbia* (Portland: Touchstone Press, 1968), pp. 16-19.
51. Remarks by Edward M. Mains for Briefing of Robert E. Jordan, III, 27 Sept. 1968, "Current Controversial Fish Issues," NPD, RHA, Executive Office Files, "Fish Passage." Jordan was a special assistant with the Chief's Office.
52. Lewis to Hoover, 14 Feb. 1930, RG 77, Seattle FARC, NPD 501/24.1, "HD 308 A & B," Vol. 1.

53. House Document 704, pp. 28–30.
54. Roy F. Bessey, *Pacific Northwest Planning*, pp. 40–43.
55. Roy Scheufele, *History of the North Pacific Division*, p. 43; House Document 531, pp. 130–32.
56. Ibid, p. 139.
57. Guy Constable to Robins, 7 Jan. 1949, Robins papers; Statements to the International Joint Commission from Charles Strickling, Oregon State Engineer, 9 March 1951; Len Jordan, 12 March 1951; Bureau of Reclamation 12 March 1951; Spokane Chamber of Commerce, 7 March 1951; C. A. Erdahl, Pacific Northwest Utilities Conference Committee, March 1951, all in Seattle District, Service Branch Files, “International Joint Commission, 1951 Public Hearings, Spokane.”
58. Johansen and Gates, *Empire of the Columbia*, pp. 533–34; Shingler to Sturgis, 12 April 1954; Sturgis to Shingler, 26 April 1954, Sturgis papers.
59. Foote to Sturgis, 11 Oct. and 12 Nov. 1954; Sturgis to Foote, 21 Dec. 1954, Sturgis papers.
60. Johansen and Gates, pp. 537–38; John V. Krutilla, *The Columbia River Treaty. The Economics of an International River Basin Development* (Baltimore: The Johns Hopkins Press, 1967), p. 9.
61. Scheufele, *History of the North Pacific Division*, pp. 44–45; Johansen and Gates, *Empire of the Columbia*, pp. 536–37; Krutilla, *The Columbia River Treaty*, pp. 165, 200.
62. Itschner to Sturgis, 28 Aug. 1953, Sturgis papers; Pendleton *East Oregonian*, 24 Nov. 1969. A total of five communities were relocated as a result of the John Day Project. See, Preston, *Walla Walla District History*, Vol. 1, p. 167.
63. “Statement on Proposed Libby Dam, Libby Chamber of Commerce to the District Engineer . . . , 24 March 1950,” Seattle District, Service Branch Files, 1505–22, “International Joint Commission, Libby Dam.”
64. Woodrow Berge to Olsen, 15 June 1966, NPD, RHA, Planning Division Files, 103–05, “Real Estate Policies,” Box 4.
65. Richard E. McConnell, “Libby Dam and Reservoir,” *Military Engineer*, 6:401 (May–June 1969), p. 181.
66. Communication, Jerald Schmunk, Chief, Public Affairs Office, North Pacific Division to author, 26 Feb. 1985.
67. Sydney Steinborn, “Aesthetic Factors in Planning and Design of Libby Dam,” *Journal of the Power Division, Proceedings of the American Society of Civil Engineers*, Jan. 1970, pp. 41–42.
68. Hyzer to Cassidy, 29 July 1966 and 1 Feb. 1967; Yates to Cassidy, 1 May 1967 and 3 Feb. 1968, NPD Quarterly Reports; Richard E. McConnell, “Libby Dam and Reservoir,” *Military Engineer*, 6:401 (May–June 1969), pp. 181–82; Donald E. Spritzer, *Water of Wealth: The Story of the Kootenai River and Libby Dam*, 1969, pp. 136–54. For information on the problems of relocating highways and railways around the reservoir see H. Dale Burkholder and Kenneth Ramsey, “Relocation Routes at Libby Reservoir,” *Military Engineer*, 61:404 (Nov.–Dec. 1969), pp. 424–27.
69. Memorandum, Don J. Geil to Chairman, Division Historical Committee, 1 April 1968, NPD, RHA, Administrative Services, 206–09, Installation Historical Files; The President’s Water Resources Policy Commission, *Ten Rivers in America’s Future*, Vol. 2, p. 64; Holmes, *A History of Federal Water Resources Programs*, p. 25.
70. Woodrow Berge to Representative Arnold Olsen of Montana, 15 June 1966, NPD, RHA, Planning Division Files, 103–05, “Real Estate Policies”; Office of the Chief of Engineers, *Digest of Water Resources Policies and Authorities*, p. 16–1.
71. Hyzer to Cassidy, 29 April 1966; Yates to Cassidy, 3 Nov. 1967, NPD Quarterly Reports.
72. Kelley to Clarke, 1 Aug. 1969 and 5 Nov. 1970, NPD Quarterly Reports.
73. North Pacific Division, *North Pacific Division Recreation Program Overview* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1978), p. 1.
74. Maj. Ronald A. Walton, Acting Walla Walla District Engineer to Division Engineer, 11 March 1968; Sawyer to Clarke, 14 Feb., 15 Aug. and 13 Oct. 1972, NPD Quarterly Reports.
75. Col. Philip T. Boerger, Chief’s Office to Division and District Engineers, 13 Aug. 1968, p. 44, NPD, RHA, Executive Office Files. This letter contains a compilation of responses to Gen. Cassidy’s letter of 16 Feb. 1968 which requested comments on ten areas in which the Corps was to improve its performance and assert leadership to meet current and future challenges.

XI

ENVIRONMENTAL LEGISLATION, INTERPRETATION AND RESPONSE



Although the Corps can take great pride in nearly two centuries of accomplishments to achieve national objectives, its leadership and professional abilities are going to be challenged as never before in history.

Brig. General Roy S. Kelley,
Division Engineer,
August 3, 1970



Flooding on the Snoqualmie River, Dec. 1964.

During the late 1950s and the 1960s, the North Pacific Division had been involved in a massive dam construction program throughout the Pacific Northwest. Only one project, Lower Granite, remained to be built to complete the inland passage from the mouth of the Columbia to Lewiston. Elsewhere, the Division anticipated building Lost Creek and Applegate dams on the Rogue River in southern Oregon. Although Congress had authorized other projects in the region, it had not approved funds. The result was a considerable decline in construction activity by 1970. Most of the authorized projects, like the Asotin Dam on the Snake River and Ben Franklin above McNary, elicited stubborn resistance from environmental groups. In 1968, the prospects for a vigorous construction program appeared dim, and the Division was forced to reduce its budget by a third. Moreover, most of the authorized work was for small navigation and flood control projects, or studies of beach erosion and channel dredging.¹

In looking ahead to the 1970s, the Division could take satisfaction in other endeavors: the initiation of the flood plain investigations; the modern reservoir control center at Division Headquarters in Portland; the treaty with Canada; a high voltage intertie system between the Pacific Northwest and the Southwest; and progress on comprehensive studies of the Columbia Basin. Although fish and wildlife problems remained a vital concern, the investments in research and hatchery construction appeared to be paying off, and the Division was vigorously testing solutions to nitrogen supersaturation of water. At this time, one of the most sensitive issues for the Division and its personnel was the popular perception of the Corps as the destroyer of fish and free flowing rivers and as an enemy of the environment in general.

While westerners had demanded and gladly accepted federal assistance in developing their water resources and welcomed cheap power for their homes and factories, another side of the Western personality deplored any alteration of the natural landscape. In the late 1960s, the latter outlook became more dominant, more vocal, and certainly more organized. With its attention focused on pollution and destruction of the ecological balance, a generation influenced by Rachel Carson's *Silent Spring* turned its environmental concerns and protests toward political action. In fact, the mood of the entire nation sympathized with the environmental movement. A majority of the public demanded federal programs and legislation to protect the environment. In 1969 Congress responded to environmental pressures for comprehensive and uniform regulation of the nation's natural resources with the passage of the National Environmental Policy Act of 1969 (NEPA) which President Nixon signed on January 1, 1970. Under the act, federal agencies were required to prepare an environmental impact statement for each proposed project that would significantly affect the quality of the human environment. This legislation had considerable influence upon the Corps of Engineers.

Before the passage of NEPA, the Corps, criticized by a 1966 Senate committee for its lack of attention to environmental concerns, issued new regulations dealing with aesthetic and environmental values. It also added to its staff 26 landscape architects and 71 specialists in environmental fields. Furthermore, the Corps supported other environmental acts, referred hundreds of water quality violations to the Justice Department, and established the Institute for Water Resources in April 1969. The Institute was directed to carry out and

monitor research in water resources and to develop new techniques relating to environmental quality, regional development, and planning on a national and international level. In April and May of that year, the Corps issued three circulars designed to bring its procedures and regulations into conformity with NEPA. Under the leadership of Lieutenant General Frederick J. Clarke, Chief of Engineers, the Corps established the Environmental Advisory Board in response to new environmental legislation and the need for dialogue with experts outside the agency and the government. General Clarke intended that members of the Board, who were drawn from the environmental field, would advise the Corps on specific policies and that this exchange of views would increase mutual understanding and confidence between the Corps, the general public, and the conservation community. Clarke also felt that the Board could help in developing a philosophy and perspective within the Corps.²

In informing the Division of its actions and plans resulting from NEPA, the Chief's Office stressed the commitments the Corps had already made to environmental protection. A letter of April 1, 1970, reviewing multiple-purpose projects and planning procedures already initiated, stated that the Department of the Army considered NEPA "to be an affirmation of existing permit practices and a strengthening of the legal basis for giving due weight to preservation and enhancement" of environmental quality. "Given this background," the letter continued, "passage of the Environmental Policy Act is regarded as a strong affirmation of administration policy."³

Environmental pressures which had brought about NEPA in 1970 also succeeded that same year in creating a procedure for enforcing water quality. Under the 1899 Refuse Act, the Corps had been in charge of issuing permits for discharges into navigable waters. It had interpreted that act conservatively to mean obstructions to navigation. In 1966, the Supreme Court ruled that the act covered discharges of all polluting materials and not just those endangering navigation. Under this interpretation, the Corps asked fish and wildlife agencies to review permit applications, and in 1967 the Corps and the Bureau of Reclamation signed a memorandum of understanding that required the Corps to notify the appropriate agency of the Department of Interior of a pending application. The Interior agency would then investigate and advise the district engineer. Until 1970, neither the Federal Government nor environmentalists recognized the potential of the Refuse Act for regulating pollution. In March 1970, Representative Henry S. Reuss, Chairman of the Subcommittee on Conservation and Natural Resources, issued a report recommending that the Corps issue permits for all discharges into navigable waterways. Under the proposal, those applying for permits would have to disclose the nature of the pollutant and the amount of discharge. Reuss applied pressure on the Corps to adopt new procedures for protecting water quality. With the assistance of Corps attorney J. J. Lankhorst, Robert E. Jordan III, Assistant Secretary of the Army for Civil Functions, presented a permit program to Congress. At a House hearing on enforcement of the 1899 Act, Jordan explained that the Chief's Office had advised district engineers to require permits for discharges into navigable waters. Later, Henry Reuss complimented the Corps for providing leadership in protecting the nation's waters. Regulation of water quality was further strengthened by the Water Pollution Control Act of 1972 and a court order of 1975 which extended the Corps' jurisdiction over the issuing of permits to virtually all the nation's water.⁴

The Corps further responded to NEPA by instituting a policy requiring a minimum of three, well-publicized public meetings to be held before a project was authorized and an additional meeting in the advanced planning stages of an authorized project if the original conditions had changed significantly. In November 1970, the Corps issued environmental guidelines for all phases of its civil works program. Under these guidelines, the Corps was to give equal weight to environmental values and to recommend projects that were both economically justified and represented the best solution to an environmental problem. Besides assuring that agencies like the Corps were giving proper attention to environmental concerns, environmental legislation gave the opponents of water projects a legal recourse. Thus litigation often replaced the mitigation measures which construction and wildlife agencies had frequently worked out among themselves.⁵

In the Pacific Northwest, litigation and public hearings became effective means of temporarily halting construction on numerous projects. The preparation of environmental impact statements also delayed projects because of the breadth of the work involved. All these factors stemming from NEPA complicated the Division's planning processes. In addition, there were at this point in time some differences of opinion on the Corps' role in the region. Speaking to a convention of the National Reclamation Association in Spokane on October 23, 1969, General Clarke focused his remarks on the idea of restoring the "frontier" through water resource development. Evoking Franklin D. Roosevelt's vision of the Pacific Northwest as a provider of new opportunities for less fortunate citizens in crowded cities, Clarke commented that efforts and investments needed to re-establish a frontier - less crowded, more attractive, and healthier for refugees from the teeming ghettos - would be less expensive and more fruitful than any other approach to current social problems. For Pacific Northwest environmentalists, however, the problem was one of protecting their natural resources from further development and discouraging the influx of new settlers. The environmentalists emphatically disagreed with Clarke's recommendations of providing water to valleys, meadowlands and plateaus in order to transform them into "productive havens for whole populations of discontented city-dwellers . . ." General Clarke was not ignorant of the environmental costs of developing the old frontier. He advocated "realistic planning that meets all needs, with full provision for the natural environment." The alternative to planning for the new frontier Clarke warned, would be the needless destruction of many natural values. Environmentalists often overlooked another point. Already, a significant percentage of the wildlife and natural resources depended on governmental propagation and maintenance programs carried out at fish hatcheries and on tree farms.⁶

On a less theoretical level, the Division faced the task of fulfilling the provisions of the 1969 Act, particularly as they applied to planning. In late April 1970, it began organizing for a briefing of key civilian personnel on environmental issues. While affirming its major goals in water resource development, the Division acknowledged the keen competition for federal dollars from other social programs. Additional challenges were coming from the environmental movement, NEPA, and the newly created Council on Environmental Quality whose chairman wanted absolute veto power over the Corps. In addition, a Congressional committee was investigating the possibility of forming a new Department of Natural Resources that would include the Corps and the Soil Conservation Service. A member of the Division's planning office warned

against overreacting. He feared the result could very well be a moratorium on construction that could be as harmful as overdevelopment.⁷

As the briefing noted, while the costs of enforcing the new environmental legislation increased, the traditional areas of responsibility had declined. There were few major civilian construction projects, and the Corps had transferred military construction from Seattle to the Sacramento District. Consequently, the Division had been forced to reduce its staff by nearly 100. There were some advantages. Division Engineer General Roy Kelley expected that new environmental programs and policies would create new positions and funding for the areas of water quality and recreation. This shift would preserve the Division's role as a major federal agency. Kelley outlined two possibilities for insuring a leadership position. One was giving the Division Corps-wide responsibility in certain engineering specialties, such as powerhouse design for hydroelectric projects. A second was in environmental engineering of waste treatment plants. Kelley expected that the President's announcement of a \$2 billion annual pollution abatement program could abruptly increase the Division's workload in an area that was historically underfunded. Moreover, these waste treatment plants were usually located on flood plains or on land adjoining them. Because an Executive Order made the Secretary of the Army responsible for providing information on flood hazards for federally financed plants, Kelley believed that some of the \$2 billion could be used to offset this increased expense. He suggested providing these services through the Corps' existing military construction organization which was faced with a declining workload. "In any event," he advised, "we should develop a stronger position in the environmental engineering field."⁸

During internal discussions of the new laws and executive orders, Delbert Olson, Chief of the Division's Planning Division, observed that although the Division was not playing a completely new ball game, it was playing by some new rules. He foresaw that the Corps' new guidelines would give economic and environmental factors equal consideration. This would require sophisticated and costly studies with various alternatives. According to Olson, the National Environmental Protection Act created complex problems of requiring the Division to coordinate environmental considerations with those of other agencies. Unlike other federal agencies which were single purpose oriented, the Corps' mission embraced multiple purpose development and construction. Whereas a single purpose agency could concentrate on one resource or program, such as outdoor recreation or fish and wildlife, and disregard how the other benefits were produced, protected or enhanced within a multiple use project, the Corps had to consider the relationships of each one. Some single purpose bureaus, Olson contended, could now use environmental quality to veto proposals from construction agencies like the Corps which had to balance economic development against other amenities. He suggested that the Corps hang a dollar sign on the extra incurred costs and on economic benefits foregone because of environmental factors. "In this way," Olson argued, "we can present to the public and the Congress a clearly understandable language upon which decisions can be based."⁹

The Division's relationships with local groups and officials was a major focus of the environmental laws and guidelines. One successful method of including the public in water resources decisions was the "fishbowl" planning process. It brought together a variety of interests and opinions through workshops and meetings and the new review study of the

Columbia and its tributaries included a survey of public comment on the draft proposals. "Serious consideration must be given to all reasonable proposals," the Division's Planning Division stated, "as these projects are intended to serve the people in as many ways as feasible."¹⁰

In order to carry out the Corps' responsibilities for environmental legislation and respond to public pressure, General Kelley established in March 1971 an environmental committee composed of the division chiefs from Engineering, Planning and Operations, and Program Development. They were to advise him on major environmental issues; focus their management skills on factors affecting the environment; and consider policy and implementation of environmental programs. Moreover, the environmental impact statement became a focal point of environmental planning and public concern. Kelley worried about the lack of uniformity in seeking out and encouraging public participation in developing these documents. He instructed the district offices to issue press releases and public announcements when the draft statements were sent to federal, state and local agencies for review. Nor were only friendly entities to receive them. Kelley directed that environmental drafts were to be widely distributed to groups like the Sierra Club and the Isaak Walton League. "This action should not only increase meaningful public participation," Kelley noted, "but should avoid the probability of accusations of inadequate coordination or withholding project information."¹¹

Despite the Division's willingness to comply with the spirit of the environmental impact statements, the task of preparing them placed an enormous burden on its staff. Kelley's successor, Major General Kenneth T. Sawyer, advised the Chief in November 1971 that he doubted the Division would be able to carry out the recent instructions to prepare statements for all authorized civil works projects by September 1, 1973. During the past year the Division had been able to prepare and file only 20 statements on the current 235 authorized projects with the Council on Environmental Quality. Fifty more were in various stages of development, leaving 165 to be prepared in less than two years. This figure would not include environmental impact statements for pre-authorized or emergency projects, or for the permit program. Even if additional staffing were available, Sawyer believed there was not enough time to prepare statements that would reflect the depth of analysis and concern for environmental matters required by the National Environmental Policy Act. Subsequently, the Chief's Office granted a longer period for preparing the statements on authorized projects, giving priority to those with the greatest environmental impact or controversy. On the remaining projects, no statements would be required unless the public or another governmental agency demanded one.¹²

Although the Chief of Engineers quickly responded to NEPA, the Division felt it had little input into policy decisions affecting the Pacific Northwest. Moreover, it was not sure how to interpret and enforce the legislation according to directives from the Chief's Office. General Kelley spoke forcibly to this point in several quarterly letters to General Clarke in 1970 and 1971. In a lengthy letter of May 8, 1970, Kelley noted some directives and policies required clarification. He explained that the Division needed these instructions to insure uniform application of pollution regulations and uniform direction for new policies and programs. One troublesome area was coordinating the Division's environmental policies with those of state and local governments. Kelley pointed out that the

Environmental Quality Improvement Act of 1970 reaffirmed that these governments had the primary responsibility for implementing the national policy of enhancement of environmental quality. "We need guidelines from your office on the areas of state and local responsibility," Kelley stated, "and the ways in which we can use our authorities to prompt state action in such areas." Kelley also inquired if the environmental laws applied to projects already authorized and, if so, how the Division could best comply with them. A related concern was funding the Division's water quality research unit. As Kelley pointed out, Congress budgeted only \$75,000 for the Corps' work in fiscal year 1971 in comparison with \$20 million budgeted for TVA.¹³

Placing great importance on the Division's public image, Kelley praised the recent completion of Lost Creek Dam in the Rogue River Basin as a successful example of cooperative planning by residents and agencies interested in the basin. In contrast to this project which exemplified the creation and maintenance of public trust, other Corps procedures were not conducive to building confidence. "There have been a number of occasions during my tenure as Division Engineer," Kelley continued, "on which I felt that policy was formulated and disseminated without full knowledge of its impact in the field." He noted how the 1960s, a time of rapid dissemination of information through all the media, often caught the Division unprepared to respond to a particular policy decision made in Washington, D.C. While not advocating that policy be made at the field level, Kelley did suggest that the Chief's office contact field agencies before formulating policy so that the impact could be understood fully. He recommended that district and division engineers first study the proposed policy changes and then send a representative to a policy seminar where the effects of the changes on the various regions could be discussed.¹⁴

A few months later, General Kelley expanded his remarks on the problem of communications between the Chief's office and the Division, again citing environmental issues. "The socio-political climate that has been relatively stable for several decades is undergoing rapid philosophical change," he observed. He believed that intensified public interest in environmental matters had led to a substantial growth in the number, size and influence of civic organizations and the establishment of special offices at state and local governments. With the increased contact between the district offices and the general public, it was imperative that the district engineer respond promptly, coherently and in local context to pertinent inquiries from these sources, and to quickly correct any erroneous information. In Kelley's opinion, the Corps' recent movement away from its long-standing policy of decentralization in an effort to reduce costs had weakened the district engineers' authority. While praising the cost-saving innovations of data processing and electronic communications, Kelley argued that the loss of these officers' credibility at the field level, "inevitably weakens the thread and fabric of the District Office and will ultimately exercise adverse effects over a broader area." Timing was crucial in this period when the role of Government in the very vital field of conservation of the nation's environmental resources was still being defined.

Kelley understood the changes going on within the Corps in the late 1960s and the implications for the traditional, decentralized structure. He stated, "it appears appropriate for higher headquarters to make a penetrating review of decision levels and related procedures with a view toward insuring that the policies and organizational philosophy of the Corps

Site of the proposed Ben Franklin Dam on the upper Columbia River, 1968.



engender a climate wherein District Engineers are encouraged to exercise initiative and to become involved with the public in the search for solutions to increasingly complex problems." Kelley acknowledged that decentralized authority carried risks and that the Chief could be embarrassed on occasion when the district engineer acted imprudently on his own authority. "However," he continued, "if the Corps of Engineers is to retain its position as the major Federal water resources planning agency and to acquire other missions in a rapidly changing situation, the risk must be assumed." Kelley again urged rapid and complete dissemination of policy at both the Chief's and division levels to support the district engineers' role and authority.¹⁵

Two incidents caused by this lack of authority at the district level occurred in Spring 1971. The Chief's Office delayed approving a request from King County, Washington, for Seattle District's assistance in developing water pollution plans for two river basins. While the office informally directed the North Pacific Division to proceed slowly because of negotiations in Washington, D.C., the district engineer lost the opportunity to participate in a comprehensive study of a large metropolitan area. Moreover, as Kelley noted, "local interests have approached us for assistance without any encouragement from the Corps." In a second case, the Chief again directed the Division and the Seattle District to delay their request to assist in a study of urban and rural drainage in the Spokane River basin. Kelley acknowledged that water quality and urban drainage were new fields and that the normal reaction was one of caution. "However," he contended, "if the Corps of Engineers is to survive in a rapidly changing environment, we must direct our resources to those areas which can most benefit the citizenry and where a grass roots appeal for assistance seems to be forthcoming." Kelley agreed with the district engineer that some risks were inevitable if the Corps were to remain a viable organization in the changing times, and he pointed out that field reports which were sensitive to

the local situation were one excellent method of developing enabling legislation in these new areas.¹⁶

The Corps' Environmental Advisory Board, like the Division, wanted more assistance on the district level. However, the Chief's Office rejected the Board's suggestion that environmental advisory boards be established within the districts, although General Clarke had suggested this in September 1970. The reasons cited were lack of qualified people and apprehension that environmental obstacles would delay planning and cause referral of projects to higher authorities. Clarke also feared intrusion of the Chief's Office at the district level, believing that the better course would be to prepare explicit guidelines and insure that the districts carried them out. Clarke did initiate the compilation of Environmental Guidelines for the Corps of Engineers which gave Corps offices guidance on environmental matters and the public more general information. Nonetheless, the Environmental Advisory Board became frustrated in the first year of its existence because it did not have a greater role at the field offices where many district officials had little interest in conservation matters. In the North Pacific Division where environmental consciousness was fairly well-developed, General Kelley argued for a compromise between the two positions: more guidance on environmental policy from the Chief's Office with input from the Division and its districts while maintaining respect for the decentralized structure of the Corps by allowing district engineers more discretion.¹⁷

General Kelley's recommendations that district engineers have more latitude in making decisions and working with the public underscored the important position of these officers within the Corps' hierarchy. As in the past, it was the district engineer who, more than any other Corps official, represented the agency to the public. Kelley's concern for his district engineers illustrated the impact of new environmental legislation and pressure groups upon the Corps. Nowhere was this manifested more clearly than in the planning process. In

previous decades of rapid national growth, water development groups, politicians, and businesses had exerted considerable influence upon the Corps and Congress. And, as the Sierra Club acknowledged in 1971, "Until quite recently the Corps was regarded almost universally as an heroic body." This was certainly true in the Pacific Northwest where organizations like the Inland Empire Waterways Association had been instrumental in obtaining funds for Umatilla Dam and the lower Snake River project through letters, public and Congressional hearings, and personal contacts. With new demands for wider participation in the planning process, the Division as well as the Chief's Office seriously attempted to carry out the intent and spirit behind the environmental legislation. In recognizing the public's demand for access to the planning stages of water projects, General Clarke included a statement in the December 1970 *Environmental Guidelines* that obligated the Corps to include public participation in the planning stages. However, the Environmental Advisory Board expressed its disappointment that the *Guidelines* were not more explicit on this point. A few months later at an open training session held for selected division and district personnel, General Clarke reinforced his position on including the public in the planning process. Clarke emphasized that the Corps could not and must not ignore voices of private citizens keenly interested in what the Corps was doing with the Nation's water resources and those who wanted to influence the planning and management of the resources. "I consider public participation of critical importance to the Corps' effectiveness as a public servant," Clarke asserted. "It is . . . an area I won't be satisfied with until we can truly say that the Corps is doing a superb job." The Chief reiterated this position in other guidelines issued in May 1971 that directed district offices to seek a clear consensus among concerned citizens and their official representatives by facilitating the resolution of a controversy. The intent of this procedure, according to the Chief's Office, was to build public confidence and trust in Corps' planning and in Corps' planners.¹⁸

All these measures and policy changes convinced the Sierra Club that the Corps was willing to compromise with the environmental movement and was communicating with private citizens and inviting their participation. In its *Citizen's Guide to the U.S. Army Corps of Engineers*, the Sierra Club not only complimented the Corps on its receptivity to the public, but it also cautioned that those who wished to become involved must also be willing to listen to the Corps' views. The sincerity of the Corps in supporting citizen participation and the willingness of each side to listen and find acceptable compromises would be tested in the districts.¹⁹

In the North Pacific Division, the Seattle District faced two challenges to its willingness and ability to accommodate the new environmental laws, policies and pressure groups. The first was the proposed Ben Franklin Dam, presented in the 1962 Columbia River and Tributaries Study. The second was the upper Columbia navigation project that had been proposed in various annual reports and studies beginning with Captain Symons' survey of 1881. After a subsequent survey, Symons concluded that developing the upper Columbia would be too costly. Later critics argued from an environmental perspective. In the late 1960s, opposition to blocking the last free-flowing stretch of the Columbia River, (the 57 miles from Priest Rapids Dam downstream to Richland) increased as part of the environmental movement. During the final stages of public review of the "308" study, a new type of opposition emerged – well-organized, professionally assisted and represented, and

arguing from fact instead of relying on emotional appeals. This group, the Columbia River Conservation League, was organized in 1968 to protest the Ben Franklin Dam and the alternative channel improvement project. The League brought together several organizations: Lower Columbia Basin Audubon Society; Richland Rod and Gun Club; Mid-Columbia Archaeological Society; Inter-Mountain Alpine Club; Pacific Northwest Chapter, Sierra Club; Richland Branch of the American Association of University Women; and, Three Rivers Chapter, Association of Northwest Steelheaders. Among the supporting organizations were the National Audubon Society, the National Wildlife Federation, and the Sierra Club. In 1968 the Division identified Ben Franklin and the navigation project as two of the four most controversial. It countered the U.S. Fish and Wildlife Service's recommendation to withhold authorization of the dam with its own recommendation for \$20 million for mitigation and fish passage facilities. The Division also discounted as exaggeration the charge that the reservoir would increase water temperatures to the detriment of fish.²⁰

After opponents of the dam sponsored a quick letter writing and radio campaign in 1968, Seattle District Engineer Colonel Richard E. McConnell approved the Conservation League's request to help provide a comprehensive view of the project. He agreed to distribute a booklet to guests invited to an inspection of the site. This guide contained information on the environmental, fish, wildlife and cultural resources that the project would affect. It marked the first stage in the publishing of materials critical of the project and the offering of information on alternatives. Then in April 1969, the Conservation League released a report highly critical of the district's methods of computing the cost-benefit ratio, an item other conservation groups had challenged. The League charged that the computations of benefits for the navigation project were speculative and biased toward this one use; that the projections of population growth were unrealistically high; and that the Corps used the old interest rate of 4-5/8 percent instead of the newer one of 5-1/8 percent. According to the League, the calculations also ignored the impact of the storage dams in Canada. Moreover, the project contained negligible mitigation for fish and wildlife, and it did not seriously consider fish and game losses. In addition, the League and Seattle District disagreed on the number of chinook salmon and steelhead spawning in the stream and the habitat losses for waterfowl and deer.²¹

The process of realigning an old study to conform to new environmental standards proved cumbersome, but General Kelley continued to support the project despite the criticisms that, he maintained, overlooked its benefits. For example, he contended that the dam would create forty new islands for nesting Canadian geese in place of the twenty that would be destroyed, and 16,000 new acres of riparian land formed by the reservoir would replace 8,000 acres presently used for brood rearing and wintering areas. Kelley disputed the claim of the Inland Chapter of the Northwest Steelheaders that the dam would mean the ecological death of the river. In response, the Conservation League argued that nuclear plants or pumped storage would be less costly than the hydroelectric project, especially since inflation has increased the original cost estimates. It further contended that the navigation project would harm archaeological sites and cause as much environmental destruction as the dam. The Washington Department of Ecology also opposed the dam and asked the Columbia River Conservation League to prepare a critique.

Flooding at the junction of the Wenatchee and Columbia Rivers, May 31, 1948.



The debate over the project came to the attention of Charles Stoddard, the head of the Corps' Environmental Advisory Board. He asked the League for another evaluation and subsequently requested a complete economical and environmental review. In the meantime, the constant champion of navigation improvements, the Inland Empire Waterways Association, tried in vain to prevail upon Congress to approve the project. It was the economic argument, however, that finally persuaded Congress to withdraw support and convinced OMB in September 1971, not to recommend authorization. The recalculation of benefits and costs produced a new rate of 0.95 to 1.²²

The Upper Columbia River project remained a viable topic into the 1970s. Controversies over environment versus development heightened with the planned installation of the third powerhouse at Grand Coulee Dam which would increase fluctuations in the water level. Environmentalists were concerned over nitrogen supersaturation of water and the fragile ecology of the desert areas bordering the river if developed recreational sites along the reservoir banks brought an influx of motorized vehicles. But as long as the predicted need for energy increased in the Pacific Northwest, proposals for large multiple purpose dams like Ben Franklin and the Asotin dam on the Snake as well as for re-regulating dams below Libby and Dworshak would continue to reappear and be considered by politicians and pro-development groups.²³

In contrast to the Upper Columbia River plan, a second proposal by Seattle District for flood control on the Snoqualmie River exemplified the concept of open, or fishbowl, planning. The Snoqualmie Basin offers recreational and scenic attractions for the Seattle metropolitan area which is only an hour's drive from the city. It is also important for agriculture, dairying and lumber. For decades the Corps had studied the need for flood control on the Snoqualmie, but it was a major flood in 1959 that precipitated definite plans. After a post-flood meeting with county officials, Seattle District developed a flood protection plan that included a dam and

reservoir. Proponents of the dam dominated hearings held in 1961 and 1967, and the District anticipated little opposition to the project when it was finalized in 1969.²⁴

However, by the late 1960s interest in preserving a greenbelt in the basin gathered supporters who mounted a well-organized campaign against structural flood control devices. By the time Seattle District forwarded its recommendations to the Board of Engineers for Rivers and Harbors, several organizations and numerous individuals had written the Board protesting the dam and reservoir. Because of this pressure, the Board requested another hearing, and the District complied in March 1970. The District invited a regional officer of the Sierra Club to give a half-hour presentation with equal time reserved for proponents of the dam. At the hearing, attended by around 1,000 people, opponents emphasized the benefits of retaining the last greenbelt adjacent to the densely populated Seattle area. They claimed the dam would encourage building and speculation in the flood plain area. They also discounted the District's methods of computing costs and benefits. Supporters of the flood control dam and reservoir generally represented local residents who disparaged the interference of outsiders from the Seattle metropolitan area who had not suffered directly from the floods. The local citizens viewed the Corps and the proposed dam as necessary for preserving the economic and social environment of the Snoqualmie and Snohomish basins. General William F. Cassidy, Chairman of the Board of Engineers, found the testimony of the seventy speakers disappointing. He remarked that the Board had heard a lot of opinion and emotion, "but very little in the way of fact." Cassidy further noted that few people had read the three-volume, technical report in full, relying instead on excerpts to justify their own opinions. On returning to Washington, D.C., he recommended the District's flood control proposal and affirmed it would not interfere with the greenbelt concept. The State of Washington did not agree, and in November 1970 Governor Dan Evans on the advice of the Department of Ecology rejected the proposal, recommend-



Applegate Dam on the Applegate River in the Rogue River Basin. Construction of the main dam was completed in 1981.

ing that the District and the state jointly develop alternative plans.²⁵

With the setbacks of the Upper Columbia and the Snoqualmie projects in November 1970, the new Seattle District Engineer, Colonel Howard L. Sargent, accepted the Governor's offer of a joint restudy. This marked a turning point for the Seattle District and the North Pacific Division toward fishbowl planning. Sargent decided to implement a comprehensive public participation and open planning system that he had developed when working at the Pentagon. According to an analysis, the Seattle District's fishbowl planning effort was an almost complete about-face for the district's planning branch, and it exemplified General Kelley's conviction that district engineers be allowed to independently work out procedures and solutions.²⁶

Sargent's restudy began with an unprecedented meeting between the Corps and the state Department of Ecology in January 1971. At this time both agencies agreed on four basic alternatives to be reviewed by the public as part of Sargent's participatory planning concept. During this period, the planning process would be highly visible to all interested organizations and individuals through workshops, public meetings and citizen committees. A brochure would be made available and continually updated during the entire study. While fishbowl planning consisted of 15 separate activities for encouraging public participation, the traditional Corps planning process contained only three: two public meetings and written notification to other public agencies.²⁷

At the first public meeting held in November 1972, participants questioned why the two agencies had selected only four alternatives. The Seattle District then invited additional proposals for review, thereby giving conservationists and recreationists the initiative in decision making. In early 1973 the District held five small workshops and a final general meeting at which time all the new alternatives were reviewed. In June 1973 it published the final version of the brochure with

descriptions of eleven alternatives. Finally, the study team submitted its report to Governor Evans. The restudy report did not offer a recommendation because, under the fishbowl planning process, consensus was not mandatory nor was it necessary to produce an approved flood control plan. However, the planning process does encourage the exchange of opinions and information which can lead to a compromise. The goals of fishbowl planning departed from the Chief's guidelines which sought to bring about agreement among opposing groups. Participants in this open type of planning do not view their efforts as futile if they fail to reach a consensus. The most important benefit from this type of planning, according to the analysis, was the respect the Seattle District won from its harshest critics for opening up the decision making process. Another study of fifteen districts and their public participation programs concluded that the Seattle planning process was more intensive and comprehensive than other districts'. The reasons cited for this achievement were the total commitment of the district engineer, the integration of the district's Chief of Planning and Public Affairs Officer into the programs and the securing of sufficient funds to make the program work.²⁸

Division Engineer General Kelley enthusiastically supported Sargent's introduction of fishbowl planning as an improvement over the old public hearing method. In 1971, after a series of public meetings and a workshop, Kelley described the new format as proving the "good general acceptance of the concept of drawing people into the study, complete and open discussion of alternatives and presenting material to the public in a manner understandable to the layman." Kelley was also pleased with the positive effects of the public brochures that Sargent introduced as part of the fishbowl planning process. The technique of using successive draft brochures, continually updated, provided a publicly visible thread linking the steps in each of the planning studies. Kelly again applauded this improvement over traditional procedures whereby the planners kept revising "The Plan" upon hearing

of objections, but did little to keep alternatives visible. Another advantage was encouraging participants to revise alternatives, but not forcing them to compromise. Instead, they could add another alternative to the brochure. Kelley noted that this method made it easy for public and private interests to express their views and receive credit for them.²⁹

The Division applied the procedure to its new comprehensive review of the Columbia Rivers and Tributaries. District engineers and Division Engineer General Kenneth Sawyer organized a series of five public meetings in Portland, Wenatchee, Spokane, Lewiston and Richland, in August 1972, for the purpose of explaining the study and encouraging public participation in the planning process. As Sawyer explained to the Portland participants, "What we are here for tonight is to stimulate and encourage active participation by the public . . . Our technique seeks to stimulate interest, to develop information, to identify alternatives and to select those which are eventually going to be recommended to the Congress of the United States." He encouraged each member of the audience to present his/her view on the study and to fill out information cards which the districts would use to develop study groups. As Sawyer explained, the groups would develop the pros and cons of any particular idea that a respondent felt was important. These ideas would be presented to public meetings and be included in the public brochure that preceded the workshops.³⁰

The environmental movement and legislation strongly affected another area of the North Pacific Division. The Rogue River basin in southwestern Oregon possesses a rugged, wild beauty and has earned a reputation for excellent steelhead and salmon fishing. The first interest in water resource development here began with the Bureau of Reclamation's irrigation investigations in 1913. Then after two calamitous floods in 1924 and 1927, local residents, irrigation districts and the State of Oregon requested the Bureau to expand its studies to include flood control. In 1948 the Bureau proposed a flood control dam. This pleased farmers and businesses but alarmed conservationists and outdoorsmen because the high dam would impede migration of spring salmon and steelhead to spawning streams. In response to pressure from fishermen, notably novelist Zane Grey, the state prohibited blocking fish migrations and reserved the Rogue for sport fishermen. The Izaak Walton League provided the organizational structure for business and wildlife agencies to mount an anti-dam campaign throughout the nation and in Congress.³¹

A destructive flood in 1955 that caused \$4 million in damages reversed the attitudes against damming the Rogue. Twenty-nine groups, including the newly formed Rogue River Flood Control and Water Resources Association, petitioned the Corps for flood control relief. The Corps had surveyed the Rogue Valley several times between 1879 and the 1930s, but it had concluded that flood storage alone would not justify a project. Then World War II and the Bureau's studies of the Rogue forestalled any further action by the Division. The Senate held hearings in 1956, and the next year it appropriated money to the Division for a study. From the first, the need for flood control grated against equally forceful demands for fish protection. The passage of the Revised Fish and Wildlife Coordination Act eased the dilemma by including fish preservation as a justifiable project objective. When the Portland District issued its multi-purpose plan for three dams in 1961, it found supporters of flood control and fishing united. Even the Izaak Walton League concurred. The acceptance of the proposed three dams and reservoirs resulted from

provisions to enhance stream flow and water quality. Irrigation and logging had reduced the water level and raised its temperature, discouraging fish from entering the river. The District proposed to improve fish habitat by releasing water from the reservoirs at critical times and by adapting multiple-level intake towers that would allow cooler water to be drawn from the lower depths and released into the streams. Fish screens would keep fish out of irrigation ditches, and a fish hatchery would compensate for fish losses. Later, fish passage facilities were removed from two of the proposed dams - Elk Creek and Applegate - as the District determined that hatcheries were less costly and more effective. Congress authorized the three-dam system in the 1962 Flood Control Act. However, it was five years before construction began on the first dam, Lost Creek, and 16 years before construction started at Applegate. Environmental concerns have continued to stall completion of Elk Creek Dam.

Although the issues surrounding the three projects were somewhat different, they aroused similar criticisms and reflected the impact of the environmental movement on water projects. Those who opposed the dams found protection of water quality a useful tool in forcing restudy of the effects of the project. For instance, the environmental group, Citizens League for Emergency Action on the Rogue, raised the issue of turbidity in 1972 after the Corps issued a draft environmental impact statement on Lost Creek that did not address this issue. Two years later the Corps completed a study that convinced Congress that the dams would help decrease turbidity. Beyond the issue of turbidity, the item that threatened to close down the project was the designation of a native salamander as an endangered specie. The subsequent discovery of the existence of numerous salamanders elsewhere overcame this objection.

Another type of opposition linking environmental and economic protests concerned the benefit-cost ratio. The Corps was severely criticized for skewing the benefits of Lost Creek with outdated interest charges of 3.12 percent instead of 5.12 percent. However, the Corps' lower rate was prescribed by the 1974 Omnibus Bill that exempted previous authorized projects from the new, higher rate. Moreover, prior to the early 1960s, there was no standard interest rate for federal water resource projects. After that, rates were based on United States securities within 15 years or more of maturity. In 1968 this rate was 3.25 percent. At Applegate and Elk Creek, critics charged that the interest rates should have been increased to 6 and 7 percent respectively. The higher rate would have changed the benefit ratio at Elk Creek from 1 to .32. A larger issue was that of calculating non-monetary values. There is no satisfactory method for quantifying aesthetic values, and it was the free flowing river and wilderness surrounding it that formed the basis of environmental arguments and law suits.³²

In 1960, with the almost unanimous support of Oregon's congressmen and governor, local farmers argued for the dams. However, the era of environmental concerns caused positions to change. The Oregon Wildlife Commission withdrew its previous support for Elk Creek in 1974 and then reinstated it in 1981. United States Representative Jim Weaver broke with tradition in vigorously opposing a local water project, one that his two predecessors had strongly supported. The large timber corporation Boise Cascade broke another precedent by joining the opposition because the project would require watershed management and erosion controls on the corporation's logging roads. The Bureau of Land Management, which owned considerable property in the area, supported the timber

company's complaint that timber production would be reduced if water quality had to be mitigated as a result of the dam.³³

The Construction of Lost Creek and Applegate and Congressional appropriation of funds to begin construction of Elk Creek demonstrated that support for flood control from local and state agencies still prevailed over purely environmental concerns. However, the struggle in the Rogue River Basin and elsewhere also proved that the Corps was responding to environmental issues and legislation through public hearings, studies and restudies of environmental impacts and by adopting more open procedures for its planning and decision making process. In 1970, General Kelley expressed his satisfaction with the Division's role in working with groups on environmental problems. He described the favorable news coverage given at the groundbreaking ceremonies for Lost Creek in August and the enthusiastic support from the speakers and the news media. This was not "just a lucky happening," Kelley observed. "It was recognized from the beginning that for any project to be acceptable it would need to have only a minimum adverse impact on some parts of the environment while providing a great deal of good for other environmental aspects." Kelley credited the Fish and Wildlife Coordination Act, water control and recreation legislation for providing the basis for the coordinated plan. The Rogue Ecology Council also admitted, "More concessions have been made at this dam [Lost Creek] than ever allotted in the United States . . . It is the greatest thing that could happen in the Valley." Even when opponents threatened litigation a year and a half later, Kelley reported they were few in number and that the Division had been able to work through a well-organized group of proponents in persuading the opposition to subside.³⁴

General Kelley's satisfaction with the Division's handling of environmental issues at Lost Creek revealed his own commitment to resolving conflicts and maintaining good relations with the public. As head of the major federal construction agency in the Pacific Northwest, he was not content to remain on the defensive. He adopted a positive and even challenging position toward the opponents of water projects. At the February 1970 meeting of the Walla Walla Chamber of Commerce with the press in attendance, Kelley stated that the Corps viewed environmental concerns not as obstacles to be overcome, but as challenges: "We stand ready to work and to work imaginatively with any group willing to approach the challenge realistically . . . Those who cry havoc and seek to halt all water resource development in the name of preserving the environment are doing a disservice to the very future generations for which they claim to be fighting."³⁵

In an interview with the Portland *Oregonian* in May 1970, Kelley expanded on his remarks by explaining that the Corps was sympathetic to mounting public concern for preservation of a high-quality natural environment. "We don't object to well-founded criticism and if it is well thought through and constructive we welcome it. But we do resent distortions, half-truths and outright misstatement of facts." Part of the Division's new approach was the reevaluation and admission of past mistakes. Kelley admitted to the *Oregonian* that some of the earlier projects were designed more for least-cost engineering and austerity than for beauty or environmental considerations. "In former years," Kelley pointed out, "feasibility from the economic and engineering standpoint largely determined whether a project should be built, and how it should be built." In explaining the new dimensional planning which included the concept of environmental

compatibility, Kelley used Libby Dam and reservoir as an example of harmonizing aesthetic, recreation, power and flood control concepts. Although he urged that attention be given to environmental matters, he warned that planning for the water needs of the future and the anticipated population growth was essential: "We must exercise foresight . . . foresight as to the needs of the future of our conservation of natural resources and also for their development."³⁶

Through the years and especially with the increasing strength of the environmental movement, the Division had learned how to shrug off attacks. A television news reporter was investigating a rumor that the Corps was secretly planning to build a dam in the John Day River basin. After conversing with the Division Office and learning that no plans were afoot, he commented, "the Corps is pretty thick-skinned anyway, isn't it?" A spokesman for the public affairs office answered, "It is mostly scar tissue."³⁷

Under General Kelley, the North Pacific Division pursued a strategy of initiating its own media presentations, delivering its message to the public and participating in public events. This meant working with groups other than the traditional supporters of water projects like the Inland Empire Waterways Association. At Libby Dam where property was being acquired over protests of land owners, the Division implemented a special public information program to explain the Corps' action, listen to public comments and consider changes based on the public feedback. Other public relations efforts undertaken by the Division and the districts included films, special briefings, participating in environmental teach-ins and seminars, sponsoring lectures and providing schools with information. Educational work yielded gratifying results. "The teachers gain a better perspective of our work," Division Engineer General Sawyer reported in 1972, "and quickly identify our materials as being accurate, complete and balanced." He further commented that this type of program reached a wider audience because students took the information home.³⁸

Despite these successes, funding for public relations programs was not certain. In 1971, the Office of Management and Budget made drastic cuts in funds for public affairs in response to excessive spending by some agencies. This forced General Kelley to deny repeated requests from his districts for increasing their public affairs staffs. The decision to cut back was made, "not because they would not have been useful and valuable," he stated, "but because I didn't feel we could afford it." Kelley explained to the Chief that much was at stake: "As you so well know, the legitimate needs to keep the public informed have been increasing by leaps and bounds with the advent of ecological warfare against the establishment and the revisions in policies relating to the administration of the Refuse Act."³⁹

However, the largest economic problems by far were the costs of implementing the new environmental legislation. A list Kelley compiled for the Chief in February 1971 revealed the scope of the problem. In Montana the Division had rerouted a state highway downstream from Libby Dam at an additional cost of \$200,000. This was done to avoid making extensive cuts, preserve the pristine appearance, give wildlife access to the river, and afford the traveler a dramatic view of the dam. The Alaska District was locating a transmission line from Snettisham Dam along a route where it would not be obtrusive. Cutting and clearing would be kept at a minimum, non-reflective materials would be used in the towers, and an inventory of bald eagle nesting sites would insure that the lines

would not disturb their nesting areas. The Corps' Waterways Experiment Station was conducting tests on shoreline erosion for Tillamook Bay and Grays Harbor, and the costs of erosion control were estimated at \$1,350,000. In addition, the Division was including in all its construction contracts a specifications

section establishing the contractor's responsibilities for environmental protection. All these measures would increase project costs considerably. But as Kelley noted, they would prevent or minimize air, water and noise pollution and land despoilment.⁴⁰

CHAPTER 11. ENDNOTES

1. Daniel W. Nordhill, "Remarks for Briefing of Robert E. Jordan, III," 27 Sept. 1968, NPD, RHA, "General Investigation Program."
2. Clarke to Charles Foster, 2 April 1974, Environmental Advisory Board Binder, Office of Assistant Director, Environmental Programs, Office of the Chief of Engineers, quoted in Martin Reuss, *Shaping Environmental Awareness: The U.S. Army Corps of Engineers Environmental Advisory Board, 1970-1980* (Washington, D.C.: Office of the Chief of Engineers, 1982), p. 1. Information on NEPA and the Corps' response also in Reuss, pp. 4-5.
3. Circular from the Chief's Office, "National Environmental Policy Act of 1969," 1 April 1970, copy in Walla Walla District, IHF, 1970, "Program of the Fifth Annual Snake River Editor's Conference."
4. Beatrice Holt Holmes, *History of Federal Water Resources Programs and Policies, 1961-1970*, U.S. Department of Agriculture, Economics, Statistics, and Cooperative Service, *Miscellaneous Publication No. 1379*. Washington, D.C.: U.S. Government Printing Office, 1979, pp. 133, 135, 137, 227; Reuss, p. 9; U.S. Congress, House Conservation and Natural Resources Subcommittee, *Hearings on Mercury Pollution and Enforcement of the Refuse Act of 1899*, 92d Cong. 1st Sess., (1971), pp. 121-125, 269-300; interview of Albert E. Crowdrey with Jacobus J. Lankhorst, 27 Sept. 1973, the last two sources in Albert E. Crowdrey, "Pioneering Environmental Law," *Pacific Historical Review*, 46:3 (August 1975), p. 347.
5. Holmes, *History of Federal Water Resources Programs*, pp. 116-17.
6. Remarks by Gen. Clarke, "Restoring the Frontier, Spokane, Washington, 23 Oct. 1969, NPD, RHA, Executive Files.
7. "Suggested Remarks for Briefing," Nordhill to Executive Assistant, 28 April 1970, NPD, RHA, Executive Files.
8. Kelley to Clarke, 2 Feb. 1970, *ibid*.
9. Remarks by Delbert E. Olson, "Briefing of Retired North Pacific Division Military Officers and Key Civilian Personnel," 18 May 1970, *ibid*.
10. Remarks of Planning Division, "Special Briefing for Don Hodel, Assistant Administrator, BPA," 8 Dec. 1970, *ibid*. For more information on citizen participation in the Corps' planning process see Daniel A. Mazmanian and Jeanne Nienaber, *Can Organizations Change? Environmental Protection, Citizen Participation and the Corps of Engineers* (Washington, D.C.: The Brookings Institution, 1979).
11. Kelley to Clarke, 6 May 1971, NPD, Quarterly Reports.
12. Robert R. Werner and John F. Wall, "The Army Corps of Engineers and NEPA," *Military Engineer*, 66:430 (March-April 1974), pp. 111-13.
13. Kelley to Clarke, 8 May 1970, NPD, Quarterly Reports.
14. Kelley to Clarke, 5 Nov. 1970, *ibid*.
15. Kelley to Clarke, 5 Nov. 1970 and 2 Feb. 1971, *ibid*.
16. Kelley to Clarke, 6 May 1971, *ibid*.
17. Memorandum, "Summary of Environmental Advisory Board Meeting, 9-10 Sept. 1970, Baltimore District Office," 22 Oct. 1970, Office of Assistant Director, Environmental Programs, Civil Works Directorate, Office of the Chief of Engineers; U.S. Army, Corps of Engineers, Institute for Water Resources, *Environmental Guidelines for the Civil Works Program of the Corps of Engineers* (Washington, D.C.: Government Printing Office, 1971). Information from these two sources are in Reuss, *Shaping Environmental Awareness*, pp. 10-16.
18. B. H. Dodge, "Achieving Public Involvement in the Corps of Engineers, Water Resources Planning," *Water Resources Bulletin*, Vol. 9 (June 1973), p. 449; U.S. Army, Corps of Engineers, "Water Resources Policies and Authorities: Public Participation in Water Resources Planning," Engineer Circular 1165-2-100, May 28, 1971, p. 3. Information from both sources in Mazmanian and Nienaber, *Can Organizations Change?*, pp. 27-28.
19. Charles M. Clausen, ed., *Engineering a Victory for Our Environment: A Citizen's Guide to the U.S. Army Corps of Engineers* (Sierra Club, 1973), P. 8.
20. Remarks by Edward M. Mains, NPD Planning Division, "Current Controversial Fish Issues," 27 Sept. 1968, NPD, RHA, Executive Office Files.
21. Clausen, *Engineering a Victory*, pp. 66-68.
22. Richland-Tri-City Herald, 26 Feb. 1970; Walla Walla Union-Bulletin, 25 Feb. 1970; Columbia River Conservation League, "Impact of the Proposed Upper Columbia River Navigation Channel," July 1969, copy in Seattle District, General Services Files, "Upper Columbia River Basin." Also, see Clausen, *Engineering a Victory*, pp. 66-71.

23. These issues were discussed at a Corps' workshop held in Richland in May 1973. See report in Richland Tri-City *Herald*, 18 May 1973.
24. Mazmanian and Nienaber, *Can Organizations Change?*, pp. 135-37.
25. Seattle District, Transcript of Public Hearing, 6 March 1970, pp. 65, 75, 85, 93, 96, 98, 101-102, 114, 194; Chairman of the Board of Engineers to Chief, 28 April 1970, p. 8, quoted in Mazmanian and Nienaber, pp. 140-144; Seattle District and State of Washington Department of Ecology, *Middle Fork Snoqualmie River Joint Study: Report to Governor Evans* (June 1973), p. 2, quoted in Mazmanian and Nienaber, p. 145.
26. Mazmanian and Nienaber, *Can Organizations Change?*, pp. 145-46.
27. Sargent's ideas on fishbowl planning are contained in his article, "Fishbowl Planning Immerses Pacific Northwest Citizens in Corps Projects," *Civil Engineering*, Vol. 42 (Sept. 1972), pp. 54-57.
28. A. Bruce Bishop, *Public Participation in Water Resources Planning*, IWR Report 70-7 (U.S. Department of the Army, Corps of Engineers, Institute for Water Resources, 1970), p. 50.
29. Kelley to Clarke, 6 May 1971; Col. A. R. Marshall, Acting Division Engineer to Clarke, 5 Aug. 1971, NPD, Quarterly Reports.
30. *Columbia River and Tributaries Review Study. Record of Public Meetings, August 23-30, 1972*, Vol. 1 (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1972), pp. I-4 to I-6; I-9 to I-10.
31. Information is taken from Keith Petersen, "The Army Corps of Engineers and the Environment in the Pacific Northwest," Ch. 2, "The Rogue River Basin Project," pp. 30-72; 1982, unpublished manuscript, copy in the Historical Division, Office of the Chief of Engineers.
32. North Pacific Division, "Summary of Project Interest Rates," January 1984, copy in Public Affairs Office.
33. Petersen, "The Army Corps of Engineers and the Environment," pp. 55-56.
34. Kelley to Clarke, 3 Nov. 1970 and 10 May 1972, NPD, Quarterly Reports.
35. Richland Tri-City *Herald*, 5 March 1970; *The Oregon Journal*, 25 Feb. 1970; Walla Walla *Union-Bulletin*, 25 Feb. 1970.
36. Portland *Oregonian*, 10 May 1970.
37. Log of telephone conversations, NPD Technical Liaison Office, 3 Feb. 1969, copy in Walla Walla District, Public Affairs Office, IHF, 412-05, "News Media and Release Files."
38. Description of these programs are in Yates to Cassidy, 3 Feb. 1968; Kelley to Clarke, 5 Nov. 1970; Sawyer to Clarke, 15 Aug. 1972; McConnell to Gribble, 31 July and 1 Nov. 1974, all in NPD, Quarterly Reports. Quote is from Sawyer to Clarke, 14 Feb. 1972, *ibid*.
39. Kelley to Clarke, 2 Feb. 1971, *ibid*.
40. *Ibid*.

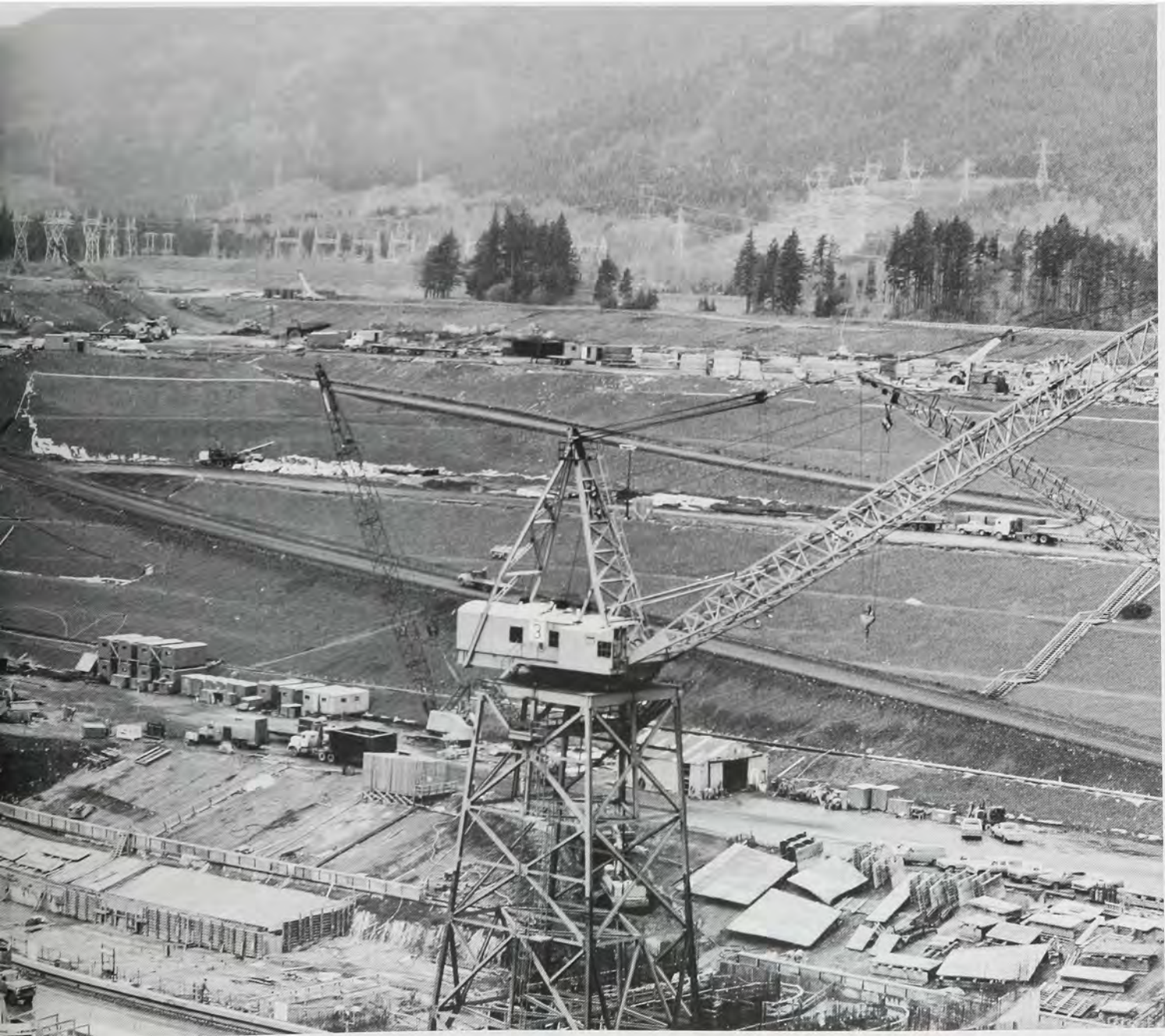
XII

POWER, HUMAN AND CULTURAL RESOURCES



Quite understandably, you have great interest in the proper stewardship of our Nation's archeological heritage and your concern is appreciated. We share this concern, along with the realization that we must consider the full impact of our activities on the total environment. The provisions of the National Environmental Policy Act will permit nothing less.

Col. Arthur R. Marshall
North Pacific Division
March 3, 1971



Construction of the second powerhouse at Bonneville Dam.

1. Power Needs and Basin Studies

In the 1970s predictions of power shortages heightened the debate over additional power projects on rivers already intersected with dams. The Pacific Northwest and the Division faced the dilemma of balancing further water resource development with environmental, recreational, and cultural needs. Under the simplified umbrella issue of hydropower versus the environment, irrigators, wilderness proponents, fishermen and hunters, Native Americans, industries, boaters, fish and game officials, archaeologists – all users of cheap and seemingly plentiful hydroelectricity – competed to protect their interests. As the opening statement of an analysis of contemporary conflicts surrounding the Columbia declared in 1979: “These are magnificent, roaring times of controversy over the Columbia River. Connoisseurs of Columbia River conflict have not had so much excitement since the 1920s.”¹

With the region now facing the reality of limited water resources, the Division participated in three comprehensive basin studies. The purpose was to determine immediate needs and forecast future requirements in order to provide water resource experts with sound alternatives. These basin studies included one on the Willamette River, Puget Sound and its adjacent waters (both coordinated with the Columbia Basin Inter-Agency Committee), and the Columbia-North Pacific Study sponsored by the Pacific Northwest River Basins Commission, the successor to the Columbia Basin Inter-Agency Committee. The Division's own Columbia River and Tributaries review, authorized in the 1970 Flood Control Act, began in 1971 and continued throughout the decade.²

The linking of additional power needs with the various basin studies was spurred on by fears of brownouts in 1969, and an actual power shortage in 1973. In the late 1960s the Bureau of Reclamation began planning for a third powerhouse at Grand Coulee, an action involving the Division because of the need to dispose of 15 million cubic yards of excavated material.³

Although development of additional power at Grand Coulee was relatively noncontroversial, other plans for new construction and alternatives to existing power structures did meet opposition. The continued interest in large, multiple-purpose dams in Hells Canyon on the Middle Snake revived protests against further damaging the fishery and esthetic values of this wilderness river. In 1968 George Crookham, Chairman of the Idaho Water Resources Board, and Idaho Senator Len Jordan stated their support for a review of all alternatives on the Middle Snake, including serious reconsideration of the Division's proposed Nez Perce Dam. “Although it is tempting to jump into the middle of the controversy,” General Elmer P. Yates confided to Chief of Engineers General Cassidy, “I feel that it is best for us at present to remain outside but always ready to furnish factual information and advice . . .” Yates also prudently declined joining the Interior Department's presentation on plans for two projects in Hells Canyon.⁴

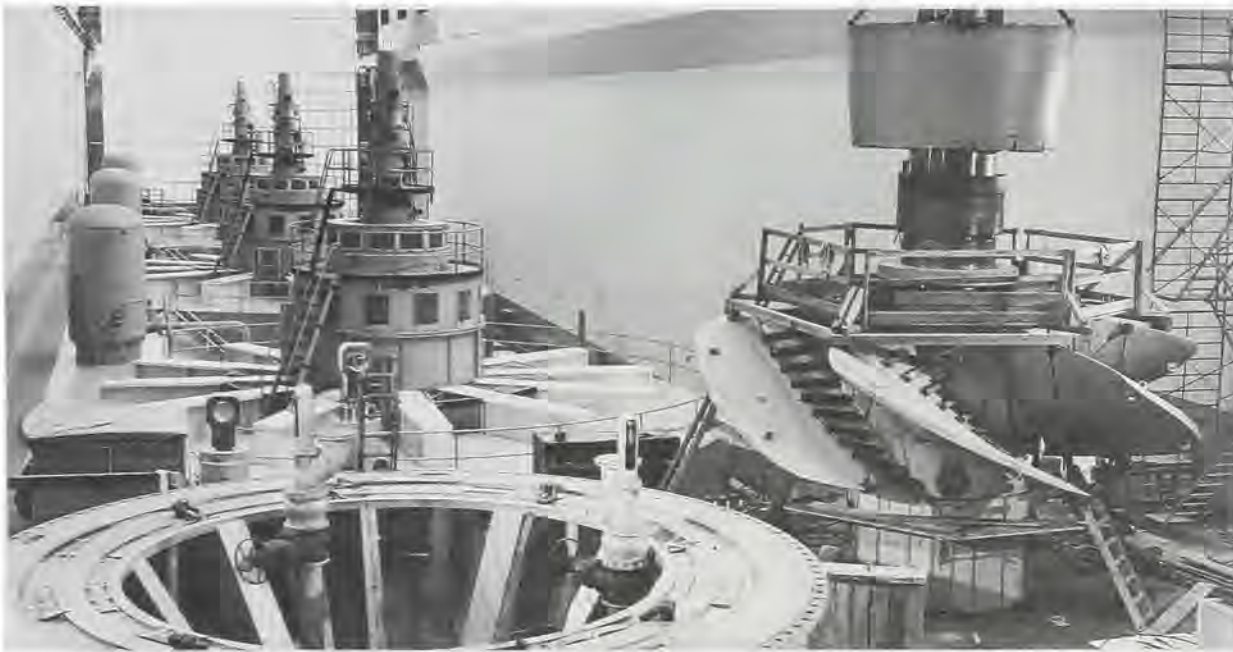
Although Yates hoped to delay entering the controversy, the Inland Empire Waterways Association vigorously joined the debate. The environmental movement and legislation had left their mark on this pro-development group, and at an August 1969 meeting, Association members and representatives from the Division and Bonneville Power Administration

Construction of second powerhouse at Lower Monumental dam on the lower Snake River, 1978.

discussed public relations programs that would engender support for water resources programs. The Association identified several factors responsible for resistance to developments at Asotin, Lower Granite and below Dworshak at Lenore where a re-regulating dam had been proposed. These included continued delay in construction that generated public fears and mistrust; a natural resistance to any changes affecting the environment and the region; resentments from real or imagined past injuries; a natural mistrust of the men in uniform; and failure of federal agencies to determine the impact of their national or regional programs on the local area. The Waterways Association also admitted that in presenting its own arguments and making future projections it had failed to emphasize the immediate needs of people and how they would benefit from these projects through new jobs and better living conditions. Like the Division, the Association realized the need for an effective public relations program which would “tell the full story” to local citizens and the need for factual information from the Corps, the Bonneville Power Administration, the Bureau of Reclamation, and other agencies.⁵

In October 1969 the Association reasserted its advocacy of large construction projects by recommending the building of the controversial high dam on the Middle Snake, the Ben Franklin Dam, and navigation improvements on the Upper Columbia. But it also supported funding for recreational facilities and protection of archaeological sites in the reservoir areas. While incorporating newer concerns with its traditional emphasis on power and navigation, the Association firmly supported the status quo of the Corps and the Bureau in their division of responsibilities against the latest attempt to transfer the Corps' civil works functions into a new Department of Natural Resources. Its 1969 resolutions included a warm tribute to the Corps for its faithful service and spirit of cooperation.⁶

In the 1970s the Waterways Association and its supporters faced well-organized opposition to high dams, but uneasiness over power shortages and fewer acceptable sites for power dams complicated the issues. Roy Bessey, an influential regional voice from the Roosevelt era, chastized the editor of



the Portland *Oregonian* for overemphasizing power at the expense of ecological and environmental values on the Middle Snake. He described several options including the Interior Department's Appaloosa and Low Mountain Sheep dams that would provide a compromise between power and other resources. As Bessey realized, the best remaining dam sites and the most controversial ones were on the isolated white water of the Middle Snake and its tributaries that formed the passageway for anadromous salmon into central Idaho. In the heated discussions over the future development of Hells Canyon, a lawyer for the Washington Public Power Supply System stated it would be necessary to double the Pacific Northwest's power capacity over the next ten years. The mayor of Orofino and the leading advocate for the high Dworshak Dam on the Clearwater, predicted that the pendulum would soon swing from resource preservation to resource development.⁷

Although Congress forestalled further development of Hells Canyon beyond the three small power dams built by the Idaho Power Company in 1958, 1961, and 1967, the competing demands for water led some water users to attempt to control the flow of water through the Hells Canyon dams. In the winter of 1970-71, the Federal Power Commission asked the Walla Walla District to conduct detailed investigations on flow requirements for navigation of private and commercial craft through this narrow canyon, particularly from Lewiston to Johnson Bar located 93 miles above that city. At public meetings in Boise and Lewiston, the District found a sharp disagreement among water users. Commercial and recreational boaters wanted Idaho Power to release more water from its dams to improve navigation. Irrigators and the power company protested that this could endanger water supplies for the dry summer months. The issue was partially settled when Congress passed legislation declaring the Snake River a wild and scenic river from Hells Canyon Dam to Pittsburgh Landing.⁸

Streamflow depletion and allocation of water resources had been studied and discussed for many years. In the 1950s the Division participated in an interagency study organized by

the Columbia Basin Inter-Agency Committee. Then in the 1970s the Walla Walla District in conjunction with Seattle and Portland Districts investigated irrigation depletions and instream flows as part of the larger Columbia River and Tributaries investigation. In 1974, based on five-year estimates of irrigation development and water right applications in the states of Washington, Oregon and Idaho, the District attempted to temporarily restrict irrigation permits. When released in 1977, the final report stimulated intense discussion especially among irrigators with its unequivocal statement that the Columbia as presently developed was no longer a surplus resource. It also focused attention on a long-standing conflict over federal interference with states' water rights.

An environmental review in the late 1970s helped bring about progress in mediating the competing demands on Columbia and Snake water. The Division and thirteen other agencies attended an inter-agency meeting in September 1978. The participants discussed expanding the review to include all water users and tributaries of the Columbia and Snake. Environmental groups such as Friends of the Earth, the Sierra Club and the Oregon Environmental Council requested that non-government agencies be involved and that a program environmental statement be written.⁹

Still, the Division's primary concern in the early 1970s was meeting forecasts of increased power needs, especially with construction delays at Libby and Lower Granite. In fall of 1971, General Sawyer discussed the power situation in the region with Henry Richmond, the head of the Bonneville Power Administration. Richmond advised Sawyer that the slippages would mean a 620 megawatt deficit in peaking capability in 1972. And because two-thirds of all power produced in the region was used by commerce and industry which had low priority for electricity, Sawyer feared a low water year would mean cutbacks in production and employment. Sawyer advocated expediting the powerhouse contract at Libby and adding units at Chief Joseph. Because of legal opposition from sportsmen, it would be impossible to maintain the Lower Granite construction schedule. The Division also supported additional generating capacity at Chief Joseph to

re-regulate flows from the Grand Coulee powerhouse and prevent buildup of nitrogen supersaturation. It gave highest priority to Chief Joseph because of the economical cost of producing additional power, its recreational benefits, and public support. The 16 original generating units at Chief Joseph were subsequently increased by 11.¹⁰

At Libby, the plans for additional units encountered stiff opposition. Because the new units would cause abrupt changes in the streamflow, the Division recommended a re-regulating dam downstream. Delivery of power at times of high demand was becoming a serious concern to many. Montana Governor Anderson, Pacific Northwest Congressmen, and the Libby Chamber of Commerce gave strong support to the re-regulating plan. Even with this backing the project was not certain. General Kelley observed that although there was strong support for the project, if it were delayed too long, "today's supporters might be outnumbered by tomorrow's protectors." Explaining the need for peaking capacity at the main dam, he advised the BPA that in order to expedite additions at Libby and construct the re-regulating dam and power facilities on the lower Snake River dams, the Corps and the Bonneville Power Administration must develop conclusive evidence that all of these projects were needed for power earlier than previously scheduled. Despite BPA's own forecast of power shortages and the national energy crisis of 1973, the re-regulating dam was not approved, mainly because of environmental protests and opposition from Montana officials. In fact, in 1979 the General Accounting Office investigated the proposed additional generators and re-regulating dam, concluding that the project was not justified economically. It advised the BPA to explore alternatives to hydropower peaking.¹¹

In searching for additional power sources, the Division explored the possibility of pumped storage. This system pumps surplus water from a low reservoir to a high one during low demand periods. When demands are high, the water is released through turbines, generating power. Even though 1-1/2 kilowatt hours are needed to produce every kilowatt hour of power, the higher monetary value of energy produced during peak demand makes the system cost effective. The Division collected considerable information on pumped storage sites in the region, and in 1972, it prepared a report in conjunction with the Pacific Northwest River Basins Commission. The low water year of 1973, coinciding with a national energy shortage, increased public interest in alternative sources of power. These included pumped storage, thermal generating plants using fossil fuels and nuclear energy, and hydro projects that had once been rejected as environmentally destructive. In January 1974 Division Engineer General McConnell observed a more favorable climate toward pumped storage as a clean energy source, and the news media proposed developing previously contested projects such as Ben Franklin and Asotin. With BPA pursuing a plan to add a 12 million kilowatt generating capacity in the region for the period 1978 to 1986, the Division assisted the Department of Interior's efforts to secure financing of additional generating units. The Corps, Bureau of Reclamation, and the BPA began coordinating their plans for additional power units with each other in order to assure a unified development plan for the entire mid-Columbia reach.¹²

Along with new discussions and public hearings on a second powerhouse at McNary, the Division at the 1974 budget hearings responded to increased Congressional interest in pumped storage. Although McConnell was aware of the potential for pumped storage in the region, he reminded

Congressmen that detailed studies beyond the present inventory of possible sites would require specific authorization. The Division adopted a similar attitude toward the efforts of Washington's Benton and Franklin Counties to obtain a license for the Ben Franklin Dam. After the hearings, the Division pursued investigations of pumped storage sites as part of the Columbia River review. A screening process reduced the 530 acceptable sites to 43; then the input of governors and the public further reduced the number to 28, then to 8. Major obstacles to approving pumped storage projects were the adverse impacts on the environment, the inundation of agricultural land, and skepticism over the need for more power.¹³

Thermal energy was another promising source of power. Because of the region's extensive water resources, alternate sources had not been considered previously. Although the nation as a whole depended on hydropower for only 16 percent of its energy needs, in the Pacific Northwest hydropower represented 50 percent of the total energy produced, and half of this percentage came from federal multipurpose projects, all but one located on the Columbia River system. Yet predicted demands for more power and the unavailability of sites for new hydropower facilities made thermal energy appear more profitable to private companies. Even so, considerable opposition existed toward developing nuclear power and coal-fired plants. In north central Washington, thermal plants being considered or constructed in 1973 included two coal-fired, two thermo-nuclear, and three gas turbine projects. Existing large thermal plants, the Hanford nuclear plant, and a new coal-fired plant at Centralia were generally perceived to be less dependable than hydropower. In November 1971 General Sawyer noted public concern in the Columbia Basin over shifting base load power production to commercially developed power sources and using federal hydroelectric power for peaking operations.¹⁴

The Division analyzed thermal power sources in its 1974 *Inventory of Problems and Areas of Concerns* which included input from five public meetings, reviews by federal and state agencies, and further discussions at 40 other workshops held throughout the basin. Responding to concerns expressed over various types of thermal power plants, the Division commented on the advantages of hydroelectricity. Praising hydroelectric power as a tremendously valuable and renewable resource, the report pointed out that utilizing water resources conserves other power generating resources that create pollution: "This fact," it noted, "is a strong argument for review of undeveloped hydro capability against other scarce non-renewable energy alternatives." Unlike hydropower, thermal power cannot be used for peaking power because energy is lost if the generating plants are slowed or stopped. Also, because of the massive amounts of metal in thermal plants, temperature changes caused by changes in the load must be gradual to prevent damaging machinery and metal parts. On the other hand, the report admitted that hydropeaking could produce environmentally unacceptable effects on the rivers by suddenly increasing or decreasing water flow.¹⁵

In conjunction with the studies on pumped storage and thermal power, the Division explored wind power, a non-polluting source of energy. Some people believed wind could be used to pump water from a low to a higher reservoir. In 1977 Oregon Senators Bob Packwood and Mark Hatfield asked General Peel to investigate this possibility and identify sites with high wind potential. In conducting the studies, Walla Walla District found several suitable locations for windmills,

and in 1977 it placed two large windmills on a test irrigation site behind Ice Harbor Dam. Although the windmills were inexpensive to operate, they irrigated only small areas. Nonetheless, wind power remained an attractive alternative to other forms of energy.¹⁶

In the mid-1970s the Division's efforts to meet energy demands concentrated on expanding existing units, a program that found wide support among residents of the Pacific Northwest who had been alarmed by the 1973 threat of an energy shortage. In that year the BPA announced it no longer had power to sell to private utilities, and in 1976 it informed public power districts that after July 1983 there would be no power for new customers. The implications of a power shortage in a region where electric usage was the highest in the nation threatened the huge aluminum industry as well as worrying domestic users and municipalities. As part of its program to increase hydro peaking power, the Division in 1974 initiated a multimillion dollar project to double the generating capacity of the four lower Snake River dams, completing this project in 1979. It also added eight generating units at The Dalles and recommended several others, including a second powerhouse at McNary which Congress finally approved in 1980, a power plant at Lucky Peak flood control dam, and three additional units at Dworshak. This latter plan met with considerable opposition from area residents because of fluctuations in river levels and the need to build a re-regulating dam. These plans are still awaiting approval. However, the addition of a second powerhouse at Bonneville Dam proved to be the most ambitious.

In 1965 BPA requested a proposal from the Division for another powerhouse at Bonneville to generate power and regulate flows from new dams upstream. Without this additional facility, Bonneville would have served as a re-regulating dam for new units at The Dalles and John Day during their full peaking periods. The Portland District prepared a study on using Bonneville to re-regulate flows, and it held public meetings in 1971 on this plan and on a proposal for a second powerhouse with eight generating units on the Washington side of the dam. The most controversial issue was not energy versus environment but relocating the town of North Bonneville. Because of the topography of the Columbia River Gorge, the town site was the only suitable place for the second powerhouse.¹⁷

At first, prospects for an amicable settlement seemed hopeful. The mayor of Bonneville announced in 1971, "The city council is all for relocation. We can build a model town for Skamania County. Not many towns have the opportunity we have." The optimism of town residents and the Division in relocating an entire community was not misplaced. Similar efforts in rebuilding portions of Arlington, Oregon, in the late 1960s and integrating an influx of construction workers and new housing at Bridgeport, Washington, in the late 1950s had been successful. After consulting with the Bridgeport townspeople, the Corps built permanent homes for workers at Chief Joseph Dam in order to prevent the type of shanty, open-town atmosphere that had plagued the Grand Coulee and Bonneville projects.¹⁸

While the Division had experience in rebuilding sections of towns and working with communities to minimize the impact of construction activities, this was the first time it faced the challenge of relocating or recreating an entire town. In order to authorize the relocation, Washington Representative Mike McCormack included a provision in the 1974 Water

Resources Development Act. This allowed the Corps to negotiate with North Bonneville in planning a new town, to act as a real estate broker, and to construct new facilities. Usually the government compensated people who were forced to move to other towns instead of building a new town. In planning for the new community, the Corps and town residents shared an equal veto. According to General Richard M. Wells, Division Engineer, this put the townspeople in an extremely strong position during the years of negotiations. In the spirit of full public participation and consultation, the Portland District prepared alternative plans, held numerous workshops, and surveyed residents to find out if they wanted to relocate as a community to a new site or preferred to move to other communities. Because the surveys indicated that 57 to 70 percent wanted a new town, the Division found itself in the unexpected role of town planner. In 1974, an important disagreement emerged at the onset of the relocation studies just as construction began on the second powerhouse. The Division believed, that based on the latest survey, only 58 percent of the town should be replaced, but North Bonneville remained adamant in seeking a 100 percent replacement. During litigation over land acquisition for the second powerhouse, the parties agreed that the Portland District would construct replacement facilities and services capable of supporting a population comparable to that of the existing town. The District also obtained enough land to accommodate an optimum town of 500 households or 1500 people, although the actual population in 1974 had declined to 210 households. Master planning for the "initial", as opposed to the "optimum", town was based on a population of 600.¹⁹

During succeeding years, relocation efforts were plagued by lawsuits directed against the Corps. North Bonneville sought more compensation than either the Portland District or the Division felt was legally justified. The town's position of protecting its "long-term cohesion and economic viability" clashed with the District's assertion in the environmental impact statement that it was "not authorized to run a chamber of commerce type operation to insure 'viability'." In working out agreements and compromises, the Portland District agreed to assist residents to locate financial assistance for businesses and homes in the new town, to convey lands at prices comparable to costs of unimproved land, and to provide free housing in mobile units during the transition phase. In return, North Bonneville dropped its claim to land in the old town site and modified an anti-noise ordinance that would have made construction impossible. Although Portland District completed the new town in March 1977, serious disputes remained. The Corps was forced to obtain a court order for possession of municipal property in the old town when North Bonneville refused to grant construction permits to the contractor. Even as the town appealed the judgment to a higher court, the Portland District began deeding residential lots and selecting commercial sites for those businesses not submitting their own selection affidavits. The District announced that if the town's businesses could not reach total agreement, it was prepared to hold a lot drawing. The strained relations over the relocation obscured the substantial progress being made on the second powerhouse and on the new town's roads and other public facilities. The next year, the Corps exchanged a deed to the new site for a deed to the old town. The modern town of North Bonneville, dedicated in July 1978, had cost \$35 million.²⁰

Unfortunately, the dedication did not signify an end to the dispute with North Bonneville. As Portland District Engineer



Dedication of new town of North Bonneville, July, 1978.

Colonel Harvey L. Arnold explained to General Wells that October, "Our sense of accomplishment and relief due to the successful clearing of the Bonneville powerhouse construction area is diminished by continuing, time-consuming disputes with the Town of North Bonneville." He added that the issues should be handled very carefully: "All of them are complex; and many are included in current lawsuits." In fact, the town had refused to accept ownership of most of the facilities, leaving the Division responsible for the water and sewer systems. The legal negotiations with North Bonneville continued into the fall of 1980 when the government's obligations were finalized under the relocation contract and the acceptance of the town plats.

The well-publicized squabble between the Division and North Bonneville elicited much sympathy for the embattled residents. According to General Wells, Division Engineer at the time, the townspeople "asked for an awful lot including some things we considered to be ill advised, including a beautiful, modern sewage treatment plant but very expensive to operate." The main battle occurred when the District initiated steps to evict people from their temporary homes because, according to Wells, they had shown little interest in developing new ones. "Otherwise," he noted, "it could have gone on for another century." The media's interpretation of this move, again according to Wells, was that "monsters from the Corps of Engineers were evicting these poor people." On the contrary, Wells believed that the people acquired a much better town and some, in fact, profited from the whole transaction. Wells remarked that although he would not want to go through it again, if he had to, it would be better to have some means of quickly arbitrating issues at the beginning.²¹

2. Native Americans and Cultural Resources: New Challenges to Water Resource Projects

North Bonneville represented a new type of engineering, social engineering, that arrived with the environmental legislation in the 1960s. The environmental movement reinforced a consensus among citizens and politicians that the federal government now had a wider obligation to protect individual rights. One of the most sensitive of these rights involved claims of Indian tribes to water and fishing resources. The disputes that erupted in the courts in the 1970s originated in government actions taken more than a century earlier when white colonists acquired claims to Indian lands. In 1854 Isaac Stevens, the Governor of Washington Territory, began negotiations with Indians living at the head of Puget Sound. Then in 1855, Stevens, acting in the capacity as superintendent of territorial Indian affairs, and Joel Palmer, his Oregon counterpart, met with the very powerful and independent Indian tribes at a council in Walla Walla. About 6000 Indians, representing the Cayuse, Walla Walla, Umatilla, Palouse, Yakima and Nez Perce tribes attended. The government gave the tribes money and promised to establish schools and other facilities on three reservations. Although the government could build roads through the reserved lands, the reservations were declared to be for the exclusive use and benefit of the Indians. The treaty also specified that the Indians had an exclusive right to take fish on the streams running through or bordering their reservation lands, and at all other usual and accustomed stations.²²

As immigrants settled the Pacific Northwest, commercial fishing companies reaped large harvests and profits, paying scant attention to the Indians' fishing rights or to fish conservation. Some efforts were made to build fish ladders and hatcheries to protect the salmon runs. The Bureau of Fisheries built the first fish culture station in 1888 on the Clackamas River in Oregon. Then in 1894 the U.S. Commissioner of Fish and Fisheries investigated the deterioration of fisheries in the Columbia Basin. It found that although salmon had been abundant on the upper river as late as 1878, they had become scarce by 1882. Local Indians reported that since 1890 few had been seen at Kettle Falls on the upper Columbia.²³

Tribal representatives
at the dedication of
McNary dam, 1954.



In the late 1920s and 1930s, proposals for dams in the Columbia Basin raised the issue of protecting fishing rights. Responding to an inquiry from the Colville Indian Association, the Chief's office expressed its ignorance "as to the nature or extent of fishing rights which may be granted the Indians by treaty," and could offer only general advice. Explaining that state authorities in Washington and Oregon and the Federal Bureau of Fisheries had taken measures to protect and foster the migration of salmon in the waters of the Columbia River, the Chief's Office assured the Colville Indian Association that "should additional dams be erected in the Columbia River in the future, it is reasonable to believe that the authorities referred to will continue to insist upon proper measures being undertaken to protect fish life."²⁴

Focusing on traditional, authorized areas of water resource development – power, flood control and irrigation – the first comprehensive Columbia River and tributaries reviews did not investigate treaty rights nor other social and environmental concerns. However, the vital link between the Indian's traditional way of life and the salmon runs was not ignored by everyone. The sight of native fishermen at Celilo Falls, poised on spindly wooden platforms above the rapids spearing salmon, had amazed travelers and journalists since the earliest settlement days. With completion of Grand Coulee and Bonneville dams, writers like Richard Neuberger in the late 1930s emotionally and poignantly described the effect of these dams on Indian culture: "Klinquelt of the Klikitat tribe . . . glanced downstream toward Bonneville and upstream toward Grand Coulee where the Federal government is building the largest dams in history. He showed his dry salmon spear to the other Indians who clustered anxiously around him. 'No salmon like it used to be . . .'" As an ardent exponent of New Deal philosophy, Neuberger reported that the Indians believed they had witnessed the last great spring migration. When the temporary cofferdams at Bonneville halted the spring migrations, he described how "the Indians descended menacingly on the army engineers in charge of construction, and for a few minutes another Custer's massacre threatened." According to Neuberger, the engineers averted

the crisis by blasting a hole through the structure, but the conflict between Indian fishing rights and power development had only begun. There was little the Indians could do but protest the infringement on their rights. Participants at the annual convention of the American Indian Federation in Lewiston, Idaho, passed a resolution demanding federal protection of the fishing grounds at Bonneville and at upstream sites that would be flooded.²⁵

By the 1940s the government was giving more consideration to Indian fishing rights, especially with the prospect of additional dams on the Columbia and Snake rivers. The McNary project, authorized in 1945 and funded in 1946, would flood Indian burial sites in an area that had served as an important crossroad for several tribes. Discussions with the Confederated Tribes as to the proper handling of the graves were complicated by the fact that the exact sites were unknown. Colonel Whipple and his staff from the Walla Walla District suggested that the remains should be left undisturbed under the water. After negotiating with the tribal chiefs in July 1949, the tribal council agreed. Subsequently, artifact hunters ignored the agreement and despoiled some of the sites. This led to protests from the Indians. Nonetheless, tribal representatives attended the dedication of the dam, a sign to observers of their willingness to cooperate with the Federal Government.²⁶

The authorization of The Dalles Dam brought to a head the unresolved question of Indian rights. The dam would inundate Celilo Falls, the customary fishing site for several tribes. The 1948 review of the Columbia and tributaries had anticipated this problem. It unequivocally stated, "The general social problem of a satisfactory mode of life for these Indians if they are displaced must be considered, as well as their legal right to reimbursement." It noted that approval of the main control plan gave the Indians the right to "negotiate, convey and relinquish property." It also advised that the problems should be solved in advance rather than later by costly and protracted litigation.²⁷

Because of the legal ramifications of destroying the traditional Indian fishing grounds, the Division became closely

involved in the steps leading to a cash settlement. The Portland District handled the negotiations, awarding the Yakimas \$15 million and the Umatilla and Warm Springs tribes around \$4.5 million each. Charles Luce, a Walla Walla attorney and later head of the Bonneville Power Administration, represented the Indians in their case against the Corps. The court took no action on a claim filed by the Nez Perce against the McNary project. In this suit, the Chief of Engineers directed the Division to handle the negotiations – a decision which a Division official described as tedious and onerous. The Division negotiator contended that the Nez Perce were not entitled to a settlement but offered \$2.8 million. This was considerably less than what other tribes had received on a per capita basis, and less than the \$6 million the Nez Perce requested. Despite public and political support for the higher claim and numerous appeals to the Chief of Engineers and Congress, the Nez Perce were forced to accept the offer. When the dams flooded their fishing sites, the Indians adapted to the change by using modern fishing techniques and gear, thereby becoming more competitive with commercial fisheries. They also challenged states' jurisdiction over fishing limits and seasons.²⁸

Facing plans for further development of the Snake and Clearwater Rivers and the continued decline of fish runs, Northwest Indians began speaking out more strongly to protect their treaty rights. When the Corps held public hearings in 1953 in preparation for the new review study, Joe Blackeagle, representing the Nez Perce, testified to the tribe's unalterable opposition to the dams. Blackeagle reminded the audience of the 1855 treaty which initially had reserved their rights to take fish at any time at their accustomed places and to hunt, a provision that the Idaho Supreme Court upheld in 1953. At that time, the Court ruled that the purpose of maintaining these traditional rights was not for sport or recreation, but subsistence. Blackeagle suggested that since the Corps' engineers calculated water and electric power in terms of dollars and cents, the losses to the Nez Perce should be computed the same way. "We maintain," he asserted, "the premise that each and every barrier erected in the Clearwater River or any of the rivers disrupts the natural propagation habits of the migrating salmon. This cannot be refuted or denied, regardless of how many ladders and other mechanical devices are installed to compensate for the disruption of the natural spawning habits – in plain words, to 'teach the fish new tricks'." Colonel Tandy, who had negotiated with the Indian tribes at McNary Dam, responded that if competent legal authorities determined the government had an obligation toward the Nez Perce, the Corps would comply. Later Tandy assured Blackeagle his statements would be included in the review report and invited him and his legal counsel to review the pertinent section of the report.²⁹

Court actions reinforced national awareness of Indian rights – an awareness that grew along with the environmental movement. Although the Supreme Court in 1908 had upheld the rights of Indians to water on or adjacent to, or flowing through their reservations, large irrigation projects, particularly the federal reclamation ones, had ignored this ruling. Sixty years later in 1963, the Supreme Court decided that the Southwest Indians had the right to sufficient water on the basis of "practicably irrigable acreage" on the reservation. In the 1970s, the National Waterways Commission and the Department of Interior recognized in major reports that the courts would be the means of resolving the problem of water rights.³⁰

In the Pacific Northwest, Native Americans, like the environmentalists, realized the importance of organization and legal counsel, and the power of the courts to protect their interests. The review study of the Columbia and Tributaries undertaken in the 1970s afforded Indians an opportunity to participate more fully in the planning process and bring their views and legal rights to the attention of the Division and the public. The rights included sufficient water from streams bordering, traversing or originating on reservation lands and on all waters of the Columbia and tributaries adjoining on and above the reservation. Attorneys for the Colville Confederated Tribes in northeastern Washington requested the Seattle District to keep them informed of the study. They suggested a conference for representatives of the Colville Tribe, the Bureau of Indian Affairs and district personnel. In addition, the Bureau of Indian Affairs invited the Corps to participate in a meeting of the Confederated Tribes. The Division quickly accepted the invitation. At the 1972 hearings on the "308" review, representatives of the Warm Springs and Nez Perce tribes complained of discriminatory treatment. The Warm Springs Tribe, which was in communication with other tribes in the Southwest, emphasized the danger of plans to divert water from the Pacific Northwest to the Pacific Southwest. A spokesman from the Nez Perce Tribal Executive Committee, Leroy L. Seth, advised the Division that the tribe wanted to be notified of all future Division meetings and workshops. Seth also pointed out that the Indians were listed on the last pages of the Corps' pamphlet on the new study: "We are just like the totem pole, we are on the bottom, but we must be the base."³¹

The Division included the concerns of Indian Nations in the 1973 *Plan of Survey* for the Columbia and Tributaries report and its *Inventory of Problems and Areas of Concern*, published in 1973 and revised in 1974. In the 1973 inventory, the Division responded to the Indians' concern about possible loss of their historic water rights by including an inventory of water resources on all reservation land. The Indians' claims to water rights at a time of fierce competition from other users were extensive and potentially damaging to hydropower and irrigation interests. The Division hoped that involving Indians in the planning process would lead to an amicable settlement of this and other problems such as fish mitigation.³²

While the Division proceeded with the preliminary study of the Columbia and tributaries, the Umatilla Indians won an injunction against further modifications at Bonneville, The Dalles and John Day dams. They argued that increasing power production would raise water levels and peaking fluctuations, further damaging fishing sites. Although the court saw no damage accruing to the government from suspending construction, Division Engineer General Sawyer firmly disagreed. He viewed it as not a case of choosing dams over fish but of preserving the fishery. In attempting to resolve the problem, the Division cooperated with other federal and state agencies in its research program and compiled guidelines for the peaking discharge. Sawyer hoped the court would allow work on the dams to continue and also permit unrestricted peaking operations during the winter when energy demands were high and no fish migrations occurred. The Colville and Spokane Indians raised similar concerns about fluctuations from additional power units at Chief Joseph. Here the Division avoided a lawsuit partly because of its willingness to meet with the tribes, schedule workshops, and cooperate with other agencies to provide employment, another major concern of the tribes.³³

In the Umatilla case, the court extended the injunction to June 30 in order to give the Division more time to respond to the complaint, and also to allow the government and the Umatillas more time to resolve the dispute. Pleased with the progress of the negotiations, the judge extended the stay of execution until August 30, but a bill introduced in Congress giving the Division authority to improve, protect and preserve the sites given to Indians to replace traditional ones flooded by water impounded behind Bonneville Dam, failed to pass. As delays continued, the Division fretted over the suspension of its construction plans. "My sensing is," Sawyer complained, "that the defendants now wish they'd never brought suit." Meanwhile the Division worked on improving the wording of the agreement that they hoped would settle the conflict.³⁴

While this suit dragged on, the Umatillas planned another action to prohibit the Corps from building a dam on Catherine Creek in northeastern Oregon which had been authorized in 1965 as a multiple-purpose project. They based their case on the 1855 treaty, arguing that Catherine Creek was their usual and accustomed fishing station. Although the government reached an agreement with the Umatillas in August 1973, whereby the Division would continue its research on peaking operations, the discussions over Catherine Creek dam were not fruitful. In 1974 the Umatillas sued, and at the subsequent trial they argued that the dam would destroy the clear, shallow water from which fish were taken by traditional fishing methods. Confronted with the implications of the case, Judge Robert Belloni remarked, "Can any stream in the Northwest be dammed by a farmer or an irrigation district without violating the Treaty? Can ever a road, dam or city be built without touching those rights? Where do we draw the line?" Despite these misgivings, the judge ruled that the dam would violate the treaty rights, and the Corps, weary of the litigation, chose not to appeal the decision.³⁵

Conflicts between Indians and other users and developers of water resources emerged elsewhere in the region. The Yakima Indians threatened a lawsuit against the State of Washington's Department of Ecology which had granted permits for large irrigation projects. They contended that the diversions would harm fish runs. In Idaho, non-Indian sport and commercial fishermen protested the Indians' fishing privileges during the curtailed fishing season. In 1980 the controversy became heated, and the Nez Perce defied the Idaho Fish and Game Department's closure of the Rapid River to salmon fishing. Weapons were brandished and arrests made.³⁶

The Division's relations with Indian tribes were not restricted to fishing rights. Water projects dating from the construction of Bonneville Dam in the 1930s threatened native American cultural sites. Unless the sites were excavated and artifacts removed, knowledge of prehistoric and historic culture would be lost. The process of salvage archaeology in the United States was directly linked to the construction of dams. Because prehistoric settlements clustered along rivers, water projects could destroy evidence of ancient cultures. Archaeological interest in the Columbia Basin, was sparked by a 1926 visit of Herbert Krieger, Curator of Ethnology of the United States National Museum, to the middle Columbia. The authorization and beginning of construction of Bonneville Dam in the early 1930s brought other archaeologists to the site. Oregon Senator Charles McNary and Representative Charles Martin joined in the efforts of these professionals to insure that archaeological sites would be investigated before construction destroyed them. After securing funds from the

Smithsonian and the Department of Interior, Krieger returned to the area in 1934. Working with hired labor, he recovered over 150,000 artifacts along the Columbia from Bradford Island to the Deschutes River east of The Dalles. The Portland District cooperated with the archaeologists at Bonneville by allowing them to photograph, measure and record objects discovered during the excavations and by insuring that the artifacts were placed in care of the Smithsonian.³⁷

Excavation of prehistoric sites uncovered skeletal remains, raising a sensitive issue of how to handle this type of historic material. Indian tribes insisted on proper disposal of the remains while scientists sought to add the skeletons to their collections. The Division refused the request of Willamette University and the University of Oregon to acquire the skeletons for scientific study, and in May 1936 it interred the remains in a cemetery vault near North Bonneville. Indians memorialized the event and the honor paid to their ancestors.³⁸

By modern standards, the archaeological investigations at Bonneville represented a fairly crude attempt to preserve prehistory. Lack of time, money, and methodical excavation led to the recovery of artifacts without the necessary *in situ* field data that could have more fully explained the cultural sequence of Indian occupation. From these first efforts at Bonneville, the field of salvage archaeology in the Pacific Northwest mushroomed as the intense construction activity along the middle Columbia and the lower Snake threatened additional sites. At the same time, public interest in the cultural history of the earliest residents and archaeological expertise and resources greatly increased. A common constituency of those interested in cultural resources and the environment pressured the Federal Government to safeguard these sites. Federal regulations, beginning with Antiquities Act of 1906, governed the Division's involvement in salvage archaeology. This act primarily sought to prevent vandalism of ruins and monuments. Under the Historic Sites Act of 1935, the Department of Interior took a leading role in protecting cultural resources and coordinating the efforts of other agencies. With the Corps and the Bureau of Reclamation planning to build several dams after World War II, archaeologists convinced the two agencies that the National Park Service was responsible for protecting the cultural resources. It asked them to cooperate with the Service in this work. Then in 1947 the cooperation between the Corps and the Bureau that had extended to the Smithsonian, the Federal Power Commission, the Civil Aeronautics Authority and the Bureau of Public Roads, encountered a major obstacle. Ruling that construction agencies lacked authority to finance salvage projects, the Bureau of the Budget placed financial responsibility for salvage archaeology with the Park Service. However, the Service did not have the resources to undertake all the essential salvage work. Although Congress authorized the Secretary of Interior to support recovery of materials threatened by the dams, funds were never sufficient. Subsequent legislation, including the 1966 National Historic Preservation Act, the 1969 National Environmental Policy Act, and a 1971 Executive Order strengthened the government's responsibility for protecting the natural and cultural environment and reinforced the authority of the Department of the Interior. Until the passage of the Archaeological and Historical Preservation Act of 1974 that permitted construction agencies to spend one percent of construction funds on archaeological work, the Corps was able to provide only limited funds for salvage work.³⁹

During the late 1960s, the Division found itself caught in a difficult and sensitive situation. As the major construction agency in an area rich in prehistoric materials, it realized the importance of cooperating with university and government archaeologists. As much as it wished to fund these projects, by law it could not. Further, as the Chief's Office interpreted the law, it could do little more than provide nominal financing and adjust construction schedules to assist excavations. The Division's role in archaeological activity during the 1960s and 1970s illustrates the frustrating problem of balancing water resource development with protection of cultural resources, complicated by shortages of funds and of time to undertake this meticulous, scientific work.

After the rudimentary field work at the Bonneville site in the 1930s, the Division's next archaeological efforts on the middle Columbia and lower Snake were devoted to removing and reburial remains from Indian graves. In this process, archaeological work became interconnected with the demands of Indians for compensation for treaty fishing rights. Although tribal councils consented to the impoundments of McNary in 1953 and Ice Harbor in 1962, the approval was not unanimous. The Cayuse, Umatilla and Walla Walla tribes barely approved the inundation of Indian grave sites behind McNary. At Ice Harbor, the Nez Perce, Yakima, Umatilla, Colville and Warm Springs Tribes consented, but only after the Walla Walla District agreed to erect an Indian memorial – a boulder carved with petroglyphs – near the site of the dam. In 1960 archaeologists like Dr. Richard Daugherty at Washington State University became alarmed that further cultural evidence would disappear with the succession of dams and reservoirs. He persuaded the Corps to award a \$6,000 contract for studying random prehistoric Indian burials at Fishhook Island near the Ice Harbor site and relocating the artifacts to the University museum. At John Day Dam, the District decided not to seek Indian approval or a court order, fearing this might lead to demands for financial compensation. Individual Indians had inquired about payments for fishing and hunting losses during the construction of John Day from 1958 to 1968, causing District Engineer Colonel Robert Giesen concern that this could set a precedent for similar demands. The District explained that it had no authority to pay for losses or damages for fishing, hunting, or inundation of burial sites. While it did promise to review and forward specific requests to the Chief's Office and to relocate any specific Indian graves, it would not search for random burial sites along the 77 – mile length of riverbank or on islands behind the dam. As Colonel Giesen maintained, this would be an almost endless and hopeless task. When the Indian tribes pressed for compensation, Walla Walla District and the Division agreed not to seek approval from the tribes nor request a court order permitting Lower Monumental, Little Goose and Lower Granite reservoirs to be filled. Instead it decided to handle claims on an individual basis with the hope this would prevent large claims and lawsuits. If such demands were made, the District would propose a memorial as had been done at Ice Harbor.⁴⁰

Giesen's situation underscored the Division's basic position on archaeological salvage at this time. It perceived its responsibilities as limited to protecting sites from vandalism, making the project site available to the National Park Service or contractors, and advising the Park Service of construction schedules. "The basic archaeological responsibility of the National Park Service," Giesen explained, "is not considered directly related to a basic function vested in the Corps of Engineers . . ." He maintained that the Corps' proper function

Marmes rock shelter, June 1967.

was to relocate cemeteries, known family burial plots, and even random, identifiable burials. Further the Department of Interior was responsible for funding and administering salvage work based on the ruling by the Bureau of the Budget. Some exceptions had been made. In 1960, Daugherty and Washington Senator Warren P. Magnuson prevailed upon the Chief's Office to release \$6,000 for archaeological work at Ice Harbor, and in 1964, the Division granted a contract to Washington State University for archaeological work on fairly recent, identifiable marked Indian burials. In this case Delbert Olson, the Division's Chief of the Planning Division noted, "Our argument could not be sustained that this work was a responsibility of the National Park Service as a prehistoric archaeological matter."⁴¹

The crucial issue of funding elicited a constant exchange of letters and public statements. Although the public, politicians, and other agencies believed the Corps should pay for salvage work at its own project sites, the Chief's Office stood by the Bureau of the Budget's strict interpretation. The North Pacific Division and other divisions confronted the immediate need for recording and preserving these records but lacked authority to release funds. A topic sheet prepared by the Division for the division engineer's conference in fall 1968 explained the dilemma:

The National Park Service budget rarely is sufficient to do much more than preliminary surveys and make limited 'digs' beginning about [the] time we start construction of a dam. Where an important discovery is made by the National Park Service (or its contractor) which warrants an extensive salvage program, the Service's lead time for a budget is often insufficient to obtain funds and get the work done before reservoir impoundment. Result: great pressure is put on the Corps to participate by granting funds for the salvage work – often on an expedite basis – and without time for the detailed and painstaking pursuit necessary for the professional archeologists to do their job properly. In summary, now we react to pressure to participate in archeological programs whereas we should plan for this problem as another project feature.



As a solution, the Division suggested legislation making survey and salvage operations a project responsibility.⁴²

Although constrained by law and practice, the Division had to respond to public criticism that not enough was being done to excavate and preserve these artifacts. An important discovery at Lower Monumental brought to a peak the public outcry and frustration. In 1962 Washington State University had begun archaeological excavations with support from the National Park Service. At the Marmes Rockshelter field workers discovered 17 human burials but no other significant material. The University terminated the work in 1964, and in 1967 the site was placed on the National Register of Historic Places. Then, quite by accident in April 1968, university geologists digging a trench in front of the rockshelter for a final check on rock strata uncovered ancient bone fragments. Dr. Daugherty immediately contacted Colonel Giesen, requesting around-the-clock security for the site and sufficient funds for further excavation which he estimated would cost \$45,000. As Daugherty flew to Washington, D.C., the Walla Walla District kept in telephone contact with the Division, the Chief's Office and Washington State University. University students guarded the site and regional newspapers gave front page coverage to the discovery of what was purported to be the oldest human remains (estimated at 11,000 to 13,000 years old) ever found in the western hemisphere. Timing became critical because Lower Monumental pool was scheduled for filling in December and fishery interests worried that further delays might harm migrating fish. By concerted effort and pressure, university archaeologists received \$120,000 from the Corps as a loan to the Park Service for expediting the salvage effort during the summer. Later, President Johnson interceded with funds for a special levee to protect the site from rising water when it became clear that the excavation and salvage operations could not be completed before the reservoir would be filled.

Although the Marmes man was an exciting discovery, the true significance of the excavation was in the accumulated record of the longest sequence of cultural history ever found, with skeletons and artifact ages ranging from 200 to 11,000 years old. Geologist Roald Fryxell stated, "In other areas it is possible to find one segment of man's past. But the possibility

of finding all the lines of man's past packaged at a single site such as we have here may be remote." This meant that the Marmes Man was not the only significant discovery, and pressure increased for preserving the site for a more thorough investigation. An executive order allotted the Corps \$750,000 to build a temporary levee, but there was no time to explore the bedrock. As the water began to rise in February 1969, the engineers discovered that, contrary to their expectations, the foundation was porous and they could not keep the rockshelter pumped dry. The District made the difficult decision to cover the excavation site, hoping that seepage would be sealed eventually by silt deposits and that the cave could be reopened for future scientific study.⁴³

When the levee around the rockshelter failed, the press, politicians and the public besieged the Corps with questions and criticisms about the levee, filling of the reservoir, and the lack of time and funds. The Division explained the special circumstances of the Marmes find, particularly the long years of field work that had preceded raising the pool behind the dam and the legal constraints. "Our role is essentially limited by existing legislation to protecting such resources from accidental or wanton despoilment," General Kelley observed a year after the Marmes discovery, "and to cooperating with the recognized authority by making our lands available for necessary functions of identifying, excavating and recovering items of significance." While he agreed that existing funds from universities and the National Park Service were not adequate for archaeological work on other dam sites along the Snake, Kelley regretted he was powerless to provide assistance in any form from project funds.⁴⁴

Troubled over the decisions prohibiting the Division from funding investigations and salvage projects, Kelley confided to General Clarke, "Our present policy seems out step with the times." He sharply disagreed with Corps policy supporting the old ruling from the Budget Bureau that construction agencies could not fund salvage archaeology. "The fact it is not based on law, but on an old, old Bureau of the Budget decision reinforces this thought," he stated. He noted that the Regional Director of the National Park Service considered the policy long out of date and that other federal agencies,

including the Bureau of Reclamation and the Bureau of Indian Affairs, provided funds for this type of work. Kelley warned that the Division had a considerable backlog of archeological work which the Park Service could not fund on its own. The necessary work just did not get done, he stressed. A current bill introduced in the Senate would permit the transfer of funds, and while it could not assist the present situation, Kelley thought that its reasoning might provide some basis for a reexamination of the Corps' present policy. The legislation would permit the Division to fund salvage work on an orderly basis, avoiding after-the-fact crash programs such as had occurred at the Marmes Rockshelter. Without a new policy, future major projects would continue to be delayed. "This would be far more expensive to the project and the nation," he concluded, "than an orderly process under which the planning and construction agent would mitigate the impact, as we do for the impacts on highways, railroads, cemeteries, towns, fish and wildlife, and other natural environmental resources." Kelley presented these same views to the division engineers' conference held in fall 1969. He recommended that costs of these investigations and salvage work be included as a project cost and charged against appropriate benefits.⁴⁵

The Chief of Engineers sympathized with the need for adequate funding and requested the Corps' Civil Works Directorate to consider issuing an engineer regulation updating policy and procedures. Although nothing came of efforts to change policy at the Chief's Office, the Division persevered in seeking funds for archaeology at the Dworshak dam site. Along with its request to the Chief, the Division stressed that archaeological excavation here would help interpret how early man survived in the difficult North American environment. "We believe that such research would be in the public interest and in consonance with the spirit and intent of the National Environmental Policy Act," Colonel John Ansley of the Division contended. Ansley emphasized the immediate need for funds because the pool raising was scheduled for the next year. He warned of creating another Marmes Rockshelter that would cause considerable unfavorable public reaction to the Corps' conservation image. Because the National Park Service had no funds for the site, he urged the Chief either to provide the \$41,000 estimated for the work or to secure special funds from Congress. Clearly disappointed by the lack of action, Ansley cautioned, "The Corps would be remiss if it did not support and attempt to provide financial assistance for archaeological salvage in the wake of intense interest in the preservation of the natural environment and archaeological history."⁴⁶

Despite the Division's urgings and protests from archaeologists, the Chief's Office maintained it could not interfere with the National Park Service's authority and responsibility in investigation and salvage work. The Corps' Civil Works directorate did request the Park Service to assess the need for a proposed study and its plans for implementing necessary investigations at Dworshak. While protesting it was not able to fund the work by itself, the Park Service denied the Corps' assertion that the Dworshak excavation was the Park Service's problem. Citing federal agencies such as the Atomic Energy Commission and the Bureau of Reclamation that had contributed funds, the Service firmly stated that it believed the Corps did have the same legal authority under the 1960 Reservoir Salvage Act.⁴⁷

Despite pressures from congressmen such as Idaho Senator Len Jordan and strenuous efforts of Dr. Daugherty, the only solution appeared to be passage of legislation that

Archeology at Hatway Creek, Walla Walla District, 1977.

would authorize Corps funding. Anticipating important archaeological work at Dworshak and at Lower Granite, the last dam of the lower Snake River project, Colonel Giesen assured the Division that Walla Walla could make these funds available once the legislation passed. An interim solution would be to release emergency funds, such as had been done at Marmes, but it would not meet the criteria of careful planning and methodical work. In the meantime the Park Service awarded a \$20,000 contract, half of what it had estimated was needed, to Idaho State University Museum for the Dworshak investigations. At Lower Granite dam where the steelhead suit had already delayed the project three years, pot hunters raided the area for cultural artifacts and skulls, desecrating the Nez Perce cemeteries and destroying archaeological and historic records. In an attempt to combat this problem, the Walla Walla District threatened legal action against pot hunters.⁴⁸

Lower Granite offered the last opportunity along the lower Snake River to study and excavate archaeological records of aboriginal inhabitants as well as those of the more recent Chinese laborers who worked on the Camas Prairie Railroad. In this endeavor, archaeologists carefully planned for four seasons of work before the pool would be raised in spring 1975. Although the Division was legally unable to fund work at Lower Granite, it did cooperate with the investigation by coordinating work of construction contractors and the archaeologists and protecting petroglyphs from destruction during the relocation of the railroad.⁴⁹

Besieged by public criticism and pressure from the Park Service, and frustrated by Corps policy, the Division welcomed a statement by anthropologist Dr. Frank C. Leonhardy from Washington State University. In this letter to Washington Governor Dan Evans, Leonhardy exonerated the Division and provided a provocative interpretation of the relationship between the dam builders and cultural resources.

What I wish to emphasize is that the question of building dams or not building dams is immediately irrelevant Without the fullest cooperation of the Walla Walla District . . . we would be unable to accomplish our mission. Indeed, it was only through the initiative of Colonel Giesen's staff that we are able to



spend a second season working where we are. Further, now that field work is in progress, the Corps' personnel have provided every assistance possible, assistance which we appreciate because literally we could not do our work without it . . . Time and money, not the Corps of Engineers are the cause of our plight. There is an ironic enigma involved — if the dams were not being built we would not have the funds to learn what we have learned thus far, yet because they are being built we will be unable to learn more.⁵⁰

During the 1970s, the Walla Walla District earned praise from other professionals for supporting archaeological work. Notably, it had reduced vandalism of sites by blocking roads, sealing caves, erecting wire fences, and relocating Nez Perce graves in the Nez Perce National Historic Park in Spaulding, Idaho. The turning point for archaeological funding by the Corps came with the passage of legislation in 1974 that authorized federal agencies to spend up to one percent of project funds on archaeology. The law allowed the Corps to administer its own contracts or transfer funds to the National Park Service. When asked by the Chief which method they preferred, district and division engineers recommended handling their own contracts. The Portland District cited as its reason the Park Service's inability to handle such requests. The law also required districts to hire an archaeologist or assign a staff member this responsibility.⁵¹

After passage of the 1974 Act the Portland District became involved in a major archaeological undertaking at Bonneville Dam, completing a 40-year period of involvement that had begun in the 1930s. Plans for the second powerhouse and the 1974 Act gave the Division a direct role in this work. On the advice of its division and district engineers, the Chief's Office decided the Corps would manage contracts itself instead of paying the National Park Service to do the work.⁵²

The initial survey uncovered four sites later found to be eligible for the National Register of Historic Places. Like the sites at Lower Granite, these at Bonneville promised to contain

major evidence of cultural changes from prehistoric to historic times. The Division assumed the Park Service would fund the excavations and salvage because of its involvement there prior to the 1974 legislation. Then in 1977 the Park Service suddenly announced it did not have money for the work. Time as well as funds were crucial. Portland District reminded the Park Service of its obligations according to a 1976 memorandum, but the Service disagreed, leaving the Portland District with the responsibility of convincing the Chief's Office that expenditures were justified. It was now up to the Division to find funds with scarcely enough time to negotiate a contract for an intensive archaeological project. The new Portland District archaeologist, Dr. John Fagan, quickly drafted the first and final versions of the contract. Both Portland District and the Division hesitated before approving the \$1,042,000 contract which they feared might set a precedent for subsequent, expensive projects at other sites.⁵³

The awarding of the contract to an independent environmental firm in Dallas set in motion a confused and disturbing series of events. Universities and the Washington State Preservation Office criticized the District for not notifying potential contractors of the project and failing to make its intentions clear. Problems with the contractors over lack of money and time, and an investigation by the General Accounting Office in 1980 demonstrated the difficulty of managing cultural resource work. Although the Division had requested a more active role in preserving cultural records, it now faced a new responsibility of supervising and protecting cultural resources. Excavations uncovered a treasury of 600,000 artifacts at one Bonneville site, but neither the Division nor the State of Washington had the means or facilities to adequately store and protect these cultural records at the time. Nonetheless, the Division had succeeded in preserving a vast amount of material for careful study and interpretation. It had also demonstrated the resiliency and ability of a construction agency to respond creatively and forcefully to pressures from new constituencies.⁵⁴

CHAPTER 12. ENDNOTES

1. Marion Marts, "The Columbia River: Some Contemporary Conflicts," *The Columbia River: An Inexhaustible Resource?*, Dale F. Stradling, ed. (Cheney, Washington: The Northwest Institute for Advanced Studies, 1980), p. 39.
2. Information on the interagency studies is from a briefing paper, "General Investigation Programs," prepared in 1969, in NPD, RHA, "Executive Office Files. For background on the 1971 Columbia and Tributaries study, see *An Introduction to The Columbia River and Tributaries Plan of Study, Coordination Draft* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1971).
3. Yates to Cassidy, 2 May 1968, NPD Quarterly Reports. The third powerhouse was authorized in June 1966 as part of the United States' commitment under the treaty with Canada.
4. Yates to Cassidy, 1 Aug. 1968, NPD Quarterly Reports.
5. Memorandum, Inland Empire Waterways Association, 6 Aug. 1969, Walla Walla District, PAO IHF, 412-05, "Inland Empire Waterways Association."
6. Resolutions, Inland Empire Waterways Association, 36th Annual Convention, 12-14 Oct. 1969, Richland, Washington, *ibid*.
7. *Lewiston Tribune*, 19 Sept. 1969; *Portland Oregonian*, 24 Aug. 1969.
8. Kelley to Clarke, 2 Feb. 1971, NPD Quarterly Reports.
9. Columbia Basin Inter-Agency Committee, *Report on Streamflow Depletion, Columbia River Basin*, 1957; *Irrigation Depletions/ Instream Flow Study* (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, 1976); Col. H. Arnold, Portland District Engineer to Wells, 5 Oct. 1978, NPD Quarterly Reports. Information on Walla Walla District's restriction of water permits is in "Minutes of Coordination Meeting of the Pacific Northwest Fish and Wildlife Agencies and the Corps of Engineers," Portland, 26 Sept. 1974, in NPD, RHA, Civil Works Project Files, 1518-10, "Nitrogen Supersaturation Program."
10. The first, 16-unit phase was placed in service in 1955 and completed in 1958. See, *Water Resource Development in Washington* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1979), pp. 61-63.
11. Kelley to Richmond, 18 Jan. 1971, NPD, Program Development Files, "Libby Dam and Reservoir"; U.S. Comptroller General, *Montana's Libby Dam Project: More Study Needed Before Adding Generators and a Regulating Dam* (Washington, D.C.: General Accounting Office, 1979), pp. ii, v.
12. McConnell to Gribble, 25 Jan. and 23 April 1974, NPD Quarterly Reports.
13. *Ibid*. For a discussion of pumped storage see Jameson, Petersen and Reed, *Walla Walla District History*, pp. 15-19.
14. *Ibid*, pp. 5-6; *Columbia River and Tributaries Review Study, Plan of Survey* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1973), p. 11; Sawyer to Clarke, 10 Nov. 1971, NPD Quarterly Reports.
15. *Inventory of Problems and Areas of Concern*, pp. III-26 to III-32.
16. James N. Peterson, et. al., *Pacific Northwest Regional Wind Energy Studies* (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, 1978), pp. 1-22, 181-204, cited in Jameson, Petersen and Reed, *History of the Walla Walla District*, pp. 21-23. Remarks on future of windpower are from interview with General Wells, Washington, D.C., 1 Dec. 1981. Hereafter cited as Wells interview.
17. Kelley to Clarke, 5 Nov. 1970 and 2 Feb. 1971, NPD Quarterly Reports.
18. *Portland Journal*, 27 July 1971, quoted in Willingham, *Army Engineers and the Development of Oregon*, p. 22. For information on the successful integration of construction workers and federal employees into the Bridgeport community see Green, *History of the Seattle District*, pp. 4-14 to 4-15.
19. Wells interview; McConnell to Gribble, 31 July and 1 Nov. 1974, NPD Quarterly Reports; *Bonneville Second Powerhouse Design Memorandum No. 8, Relocation of City of North Bonneville, Washington*, Vol. 1 (Portland: U.S. Army Corps of Engineers, Portland District, 1975), pp. 1-3 to 1-6.
20. Portland District Engineer Col. Arnold to Gen. Peel, 4 Oct. 1977, NPD Quarterly Reports; information on relocation summarized from Willingham, *Army Engineers and the Development of Oregon*, pp. 221-23.
21. Acting District Engineer Col. Dan Conner to Wells, 1 Oct. 1980, NPD Quarterly Reports; Wells interview. For a detailed discussion of the final settlement and the Corps' communications with the town see letter of 1 Oct. 1980 from Conner to Wells cited above.
22. For a summary of these treaties see Johansen and Gates, *Empire of the Columbia*, pp. 254-55.
23. U.S. Congress, U.S. Senate Miscellaneous Document 200, "Report of Commissioner of Fish and Fisheries on Investigation in Columbia River Basin in Regard to Salmon Fisheries," 31 May 1894, 53rd Cong., 2nd sess., p. 5.

24. Casey to Joseph Adolph, 2 Feb. 1932, RG 77, Seattle FARC, NPD 501, "HD 308", Vol. 8.
25. Richard Neuberger, *Our Promised Land*, pp. 123-24, 129.
26. Preston, *Walla Walla District History*, Vol. 1, pp. 197-98.
27. House Document 531, pp. 332-33.
28. Scheufele, *History of the North Pacific Division*, pp. 42-43; Preston, *Walla Walla District History*, Vol. 1, pp. 198-99.
29. Transcript of "Public Hearing on Feasible Storage Sites, Middle Snake River and Tributaries," conducted by U.S. Army Corps of Engineers, Walla Walla District, Orofino, Idaho, 20 Nov. 1953, pp. 97-100, 203-205. Tandy's letter of 24 Nov. 1953 and Blackeagles's response of 1 Dec. 1953 are on pp. 255-56.
30. Jameson, Petersen and Reed, *History of the Walla Walla District*, Vol. 3, pp. 121-22.
31. Marshall to Seattle District Engineer, 12 May 1972; Alvin J. Ziontz to Pat Keough, Study Manager, Seattle District, 23 May 1972, Seattle District, Program Planning Files, 1517-14, "Civil Works Planning, Columbia River and Tributaries Organization"; *Columbia River and Tributaries Study, Record of Public Meetings, 23-30 August, 1972* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1972), pp. I-27, IV-17.
32. *Inventory of Problems and Areas of Concern* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1973), p. 54; *Inventory of Problems and Areas of Concern*, *ibid.*, 1974, p. III-153.
33. Sawyer to Clarke, 10 May 1972, NPD Quarterly Reports.
34. *Portland Oregonian*, 23 May 1972; Sawyer to Clarke, 15 Aug. and 13 Oct. 1972, NPD Quarterly Reports.
35. North Pacific Division Fisheries Engineering Research Program, "Second Annual Progress Report," NPD, RHA, 1518-10, "Civil Works Project Files, Nitrogen Supersaturation Program; information and quotation of Belloni from Jameson, Petersen and Reed, *History of the Walla Walla District*, Vol. 3, pp. 46-47.
36. *Ibid.*, p. 123.
37. Petersen, "The Army Corps of Engineers and the Environment in the Pacific Northwest", pp. 174-78.
38. *Ibid.*, p. 179.
39. *Ibid.*, p. 179-82.
40. Giesen to Division Engineer, 25 Sept. 1968, NPD, RHA, Planning Division Files, 1501-07, "Archaeology and History, Walla Walla District."
41. Giesen to Dr. Edward Hosley, 28 March 1969; Olson to Kelley, 20 March 1969, *ibid.*
42. "Topic Sheet for Division Engineers Conference, 30 Oct. to 1 Nov. 1968," *ibid.*, "Archaeology, General."
43. For information on the Marmes discovery see letter of John L. Batt, Walla Walla District Real Estate Division to Files, 2 May 1968; *Spokane Spokesman-Review*, 30 April 1968; Delbert E. Olson, Chief of Planning Division to Kelley 20 March 1960; C.E. Evans to G. E. Mattoon, 26 March 1969; "The U.S. Army Corps of Engineers and the Marmes Rockshelter," briefing paper by John R. Ulrich, Chief of PAO, NPD, n.d.; Giesen to Hosley, 28 March 1969; and, Giesen to Washington Governor Dan Evans, 14 July 1970, all in NPD, RHA, Planning Division Files, 1501-07, "Archaeology and History, Walla Walla District." Also see Preston, *Walla Walla District History*, Vol. 1, pp. 122-23.
44. Kelley to Daugherty, 8 April 1969, NPD, RHA, 1501-07, "Archaeology and History, Walla Walla District."
45. Kelley to Clarke, 31 Oct. 1969, NPD Quarterly Reports; NPD Planning Division, "Talking Paper for Division Engineers' Conference, 15-17 Oct. 1969", NPD, RHA, Planning Division Files, "Archaeology, General."
46. The Chief's position is in a letter of 19 Dec. 1969 quoted in "Archeological Investigations and Recovery, Latest Information," NPD, RHA, Planning Division Files, "Archaeology, General;" Ansley to Chief, 2 April 1970, *ibid.*, "Archaeology and History, Walla Walla District."
47. Giesen to Division Engineer, 24 July 1970; Ernest Conally, Chief, Office of Archeology and Historic Preservation, National Park Service to Loisch, 22 June 1970, *ibid.* The House Appropriations Committee also supported the policy that the National Park Service should fund archaeological work in the Corps' reservoirs. See Max K. Tysor, Chief, NPD Real Estate Division to Acting District Engineer, Walla Walla District, 1 June 1970, *ibid.*
48. Tyson to Paul Schumacher, Chief, Archeological Investigation, National Park Service, 25 Sept. 1970, *ibid.*
49. Col. Connell, Walla Walla District Engineer to Dr. Frank Leonhardy, WSU Dept. of Anthropology, 23 Nov. 1970; Schumacher to Connell, 6 Oct. 1970; Connell to Leonhardy, 23 Feb. 1972, *ibid.*

50. Leonhardy to Evans, 23 July 1970, *ibid.*
51. Gilkey to Division Engineer, 19 Sept. 1974; Col. Marvin Rees, Executive Director of Civil Works, Office of the Chief to Division Engineers, 16 Aug. 1974; Aimonetto, "Record of Meeting on Public Law 93-291, Archaeological and Historical Resources," San Francisco, 12 Sept. 1974, Portland District Records, Natural Resources Section Files, 1501-07.
52. Rees to Division Engineers, 16 Aug. 1974; Col. Richard Childlaw, Deputy Division Engineer to District Engineers, 6 Sept. 1974, NPD, RHA, Planning Division Files, 1501-07, "Archaeology, General."
53. Petersen, "The Army Corps of Engineers and the Environment in the Pacific Northwest", pp. 184-88.
54. For discussion on the controversy over the contract, personnel problems and the GAO investigation, see Petersen, *ibid.*, pp. 188-194. The North Pacific Division subsequently established a curation facility for artifacts at the Bonneville Project auditorium building.

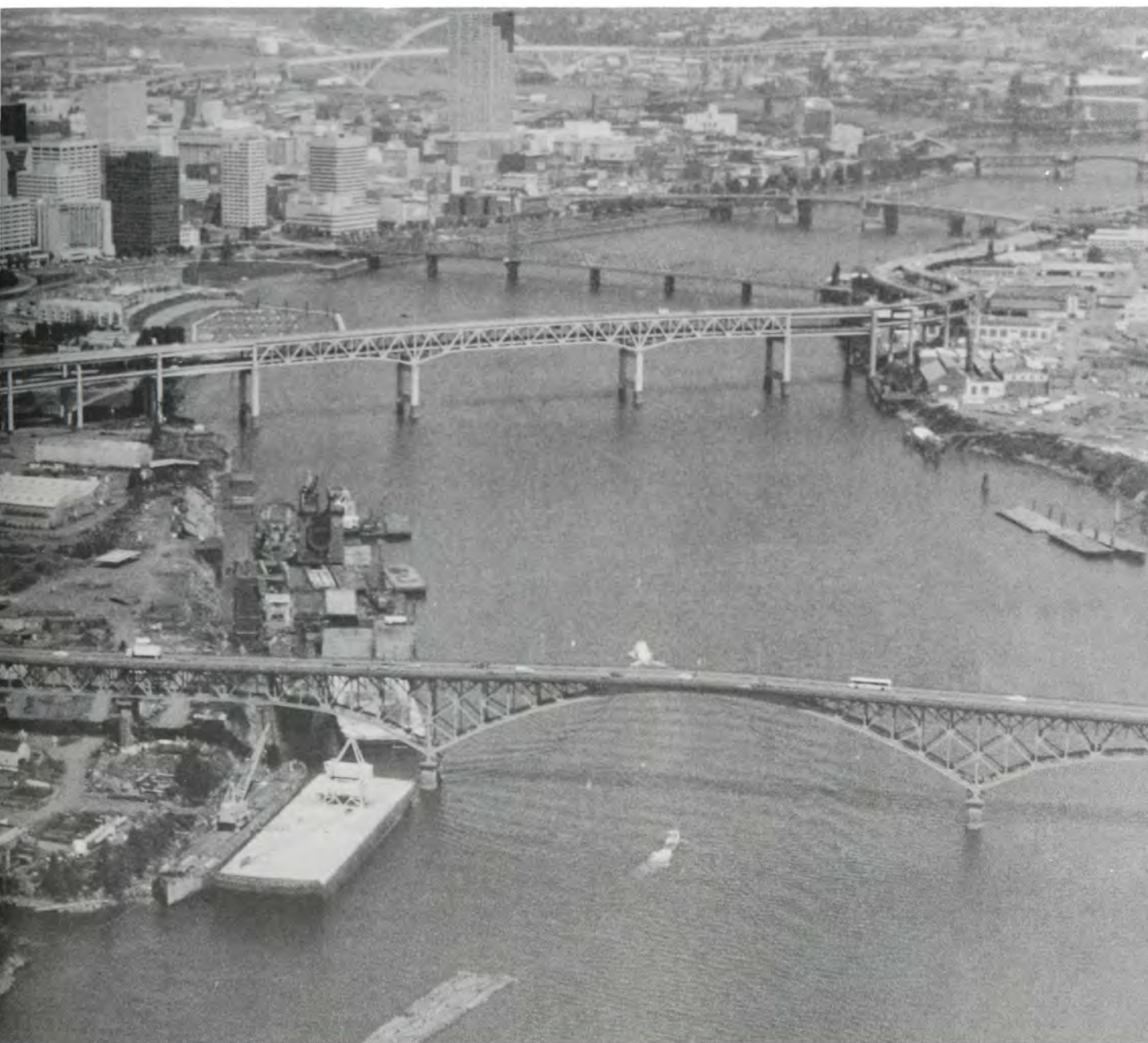
XIII

PLANNING FOR AND PROTECTING NATURAL RESOURCES



In recent years the North Pacific Division has made a determined effort to be responsive to Federal laws requiring mitigation of adverse project impacts on terrestrial wildlife species and habitat and to be good stewards of the lands we own by classifying these with potential wildlife values and implementing development and management plans for optimum wildlife use.

General Richard M. Wells
North Pacific Division Engineer
January 2, 1980



The Willamette River at Portland Harbor.

1. Water Quality and the Permit Program in the North Pacific Division.

Before environmental legislation and public concern in the late 1960s, the Corps' role in water quality was limited to protecting navigation. In 1940 for example, Chief of Engineers General Schley responded to a complaint from Washington Senator Homer Bone against the Soundview Pulp and Weyerhaeuser Timber companies for discharging waste directly into Everett Harbor. Schley stated, "Since this does not affect navigation in the waterways and has no relation to Federal laws enforced by this Department, this office has no jurisdiction in the matter."¹

Of all polluted areas in the region, Portland harbor was probably the worst because of rapid industrial and urban growth and seasonal low water in the Willamette. By 1935 effluent from pulp and paper factories, canneries, oil and other industrial plants severely reduced levels of oxygen for fish life. In planning the development of the Willamette, the Division noted its projects would reduce pollution and make additional expenditures for sewage disposal unnecessary for 30 to 50 years to come. The Oregon State Planning Board agreed that the proposed dams would reduce stream pollution by releasing water in the low water months, although in those years water quality was a less important issue than flood control, navigation improvements, hydropower and irrigation. Into the late 1940s, the pollution problem worsened with increased amounts of raw domestic and industrial sewage and wastes from fruit and vegetable canneries. Low summer flows made the situation critical. "Under present conditions," Division Engineer General Theron D. Weaver reported in 1948, "Willamette River from Newberg to the mouth is practically an open sewer during the low-water season."²

After World War II the multiple purpose development of the Willamette and Oregon's enforcement of sewage treatment plants provided a satisfactory solution. Although the dams blocked spawning areas in the tributaries, most people accepted this as a fair exchange for clean water, especially since the Division constructed fish hatcheries to compensate for fish losses. In assessing the effects of the Willamette Basin project in 1979, the Division stated, "The Willamette is now one of the cleanest streams of comparable size in the nation." The storage reservoirs, treatment of industrial and domestic waste water, enforcement of anti-pollution laws and public support all were instrumental in the clean up. Along with the clean water and fish passage facilities at the Willamette Falls came new fisheries and the reappearance of a fall run of chinook salmon.³

Another regional water quality problem created by dredging was more difficult to resolve. In the Pacific Northwest, dredging rivers and harbors is essential to keep river channels and shallow harbors open to maritime trade. In the early years dredged material had been used in filling wetlands and extending lucrative waterfront property. Few protested the filling of these seemingly unproductive areas, although in 1939 the Division did agree to cooperate with the Interior Department's Bureau of Biological Survey in taking precautions around bird refuges. Here the major concern was not to halt or suspend dredging but proper disposal of the dredged spoils, possibly by creating fresh water ponds or nesting islands.⁴

The dredge *Dan C. Kingman* operating on the South Channel over Grays Harbor bar in 1941.

By the mid-1950s the Washington State Department of Fisheries expressed its concern over the harmful effects of dredging during low water. In addition, increased tourism in coastal areas made communities like Grays Harbor aware of its scenic values. At this time, Grays Harbor began an economical transition from the once-dominant timber industry to tourism, particularly charter deep-sea fishing. Construction of freighters with larger drafts, including super vessels of more than 70-foot draft, made it necessary to dredge deeper channels in rivers and harbors that constantly filled with sediments from river freshets and ocean currents. In order to create adequate channel depths to accommodate these ships, the Division would have to widen and deepen them. More intensive dredging would keep the ports competitive, but it would adversely affect the environment.⁵

The effects of dredging are twofold. The dredging operation can disrupt and kill organisms and create turbidity in the water, and the disposal of sand and gravel in estuaries can destroy fish and wildlife habitat. Until the late 1950s marshlands were regularly filled throughout the country, primarily because they were close to the dredging operations, easy to fill, and not recognized as having ecological value. The primary concern was economic. The 1958 Fish and Wildlife Coordination Act, followed by water quality legislation in 1970 and 1972, initiated protection for these areas. These acts contained provisions controlling the harmful effects of dredging. Along with the reinterpretation of the 1899 Refuse Act, this legislation substantially altered the Corps' procedures for regulating waterways.⁶

In addition to problems of disposing of their own dredged materials, the Division administered a permit program for others intending to alter a waterway. The Corps' regulation of waterways dated to the 1899 Refuse Act, although it was restricted to navigation. In 1970 the U.S. Court of Appeals interpreted the law to cover environmental protection from refuse disposal. Congress enlarged the Corps' responsibility with the Water Pollution Act of 1972. Under Section 404 of this act, the Corps issues permits for any discharge of dredged or fill material in navigable waters. A 1975 lawsuit resulted in



legislation extending the Corps' authority over water-related construction in all but the smallest lakes and streams. In 1977 the Corps agreed to supervise planning and construction of municipal water treatment plants for the Environmental Protection Agency. One of the Division's first steps after the 1970 legislation was to inform the public about the program and coordinate this information with the EPA. The districts followed with news releases of their own.⁷

The permit program increased the Division's responsibilities and raised new issues. In 1971 it reported that the program was progressing reasonably well, considering the usual difficulties of implementing a new program, especially one affecting other agencies. Although dischargers cooperated in applying for permits, some cases were difficult to resolve without clarification from the Chief's Office. In addition, Pacific Northwest states found the Corps' permit program an unnecessary duplication of their own regulatory activities. The first applications for permits were submitted in summer 1971. The Division had hoped they would be properly prepared and non-controversial, but the very first one provoked a dispute. The Seattle District issued a discharge permit to the Atlantic Richfield Company for its refinery at Cherry Point on Puget Sound, but only after the highly controversial case received a public hearing.⁸

The permit program also meant prolonged delays for many applicants, a situation the Division attempted to prevent in 1971 by working out an agreement with the Northwest Regional Administrator of the Environmental Protection Agency. Since the two agencies seemed to be in accord on this point, General Sawyer hoped that several permits could be issued each week. About a year later he proposed another method of reducing paperwork and delays for certain permits, suggesting to General Clarke that the Corps obtain an agreement of all concerned agencies, especially Fish and Wildlife, to issue letter permits without public notice for the more routine cases. Sawyer believed the procedure would eliminate much of the delay and provide a spark to initiate detailed local planning and related Federal and State coordination.⁹

The backlog of permits increased when Congress extended the Corps' permit authority to all wetlands. The ramifications were enormous. In 1976 the American Forest Institute argued that the forest industry would have to obtain eight million permits every year at a cost of \$100 each. It asked Congress to overturn the ruling requiring permits for all routine activities such as placing culverts or constructing bridges. The Walla Walla District obliged timber interests in Idaho by issuing a general permit covering most logging operations, thereby reducing approval time for small projects from 60 or 90 days to only one or two days.¹⁰

The Division's need and desire for cooperation with the states and other agencies affected dredging as well. In the Portland District where one-third of the total number of personnel were connected with dredging operations, Division and District staff members met in May 1971 with representatives from ten fishery and environmental agencies to discuss the Corps' plans for dredging the Columbia River and coastal areas. Whereas the effects of depositing the spoils on wetlands previously had not been a matter of great concern, the wildlife and conservation agencies now expressed their fears that disposing of dredged material might harm the very rich clam and oyster beds. It was essential to systematically study the subject and work out a cooperative plan. Agency officials requested they be kept fully informed of any dredging plans and schedules and that they assist the Division in developing plans for disposing of this material.¹¹

A few months later the Division, the Environmental Protection Agency and the Department of Interior discussed coordinating dredging activities. At the meeting, the agencies agreed that the process of addressing each dredging project as a separate entity prevented a harmonious and adequate agreement. Accepting the offer of the EPA and the Interior Department to develop long-range studies of dredging and disposal sites on a regional scale, the Division directed its districts to prepare a formal summary for each dredging project. The summaries would provide a basis for more comprehensive studies and environmental statements. The State of Washington asked the Division for assistance,

including money, to study the effects of depositing semi-polluted dredged material in deep water. The Department of Interior and the Environmental Protection Agency joined the study. After two preliminary meetings in Olympia, the group proposed to use dredged materials from the Corps' maintenance dredging of Olympia Harbor for a research project to be directed by the Washington State Department of Fisheries. General Sawyer strongly endorsed the research plans and pledged his support. The study would help Seattle District determine how it should deposit the sand and gravel from Puget Sound Harbor and designate a suitable area for depositing next year's dredging. This was not insignificant considering the growing opposition to and constraints on disposing of this material.¹²

In other parts of the region the Division promoted similar interagency cooperation on environmental matters. Portland District took representatives of 12 state and federal agencies on an inspection tour of dredging and disposal sites along the 90-mile stretch of the lower Columbia. At a follow-up meeting, the District discussed short and long-range disposal programs. Although these interagency programs were necessary and helpful in working out acceptable procedures for a complicated problem, there was no easy solution. In fall of 1972, as the disposal of spoils threatened to become a serious problem, the Division incurred additional costs in attempting to satisfy everyone. It was learning that environmental safeguards, permits, and environmental impact statements were costly, complicated and controversial.¹³

Grays Harbor provided a good example of the effect of environmental regulations on a local economy. It illustrated the clash that often occurs between local residents who favor development and those committed to preserving the estuaries from further development. Seattle District's plans of providing a modern ship channel to the inner harbor of Cosmopolis required removal of from 16 to 19 million cubic yards of material annually. Public meetings held in 1975 and 1976 revealed that local opinion strongly favored the navigation improvements, and even those who expressed reservations admitted the need to enlarge the channel. The District found support for accelerating the dredging program in its study initiated in 1973. This study found that with suitable precautions, dredging need not be harmful to fish or bottom dwelling organisms. It also recommended that the word "material" be substituted for "spoils" to suggest productive uses. Dredged material could be used to create artificial marshlands and islands, replace eroded beaches, and provide access to shorelines for boaters and fisherman. The environment and the public would benefit, and the costs would compare to other disposal methods.¹⁴

Despite public support and favorable recommendations, the Division delayed beginning the project on the advice of fish and game agencies. The Fish and Wildlife Service, opposing any disposal on the tidelands, led the opposition, requesting exhaustive studies. After a 1973 meeting of local, state and federal agencies called by Governor Evans, the Division funded a two-year study. It concluded that expanded dredging operations would cause changes but harmful effects could be minimized. In 1976 another agency task force that included the Seattle District began work on a management plan for the estuary. At the same time the District continued its own engineering and design work, completing a revised draft environmental impact statement in 1976. Then, with continuing pressures from environmental groups and resource agencies, the District in 1979 organized a task force to oversee

a series of 20 environmental studies that would eventually cost \$500,000. Beginning in 1979 the District also published a *Grays Harbor Newsletter* for local residents.¹⁵

None of these studies produced a solution acceptable to all parties. Although proper dredging equipment and methods could minimize damage to harbor biota, particularly crab, the problem of disposing of the dredged material remained. In 1976 the Seattle District, responding to protests of environmentalists, abandoned the alternative of depositing the sand and gravel on tidelands. The Sierra Club, Friends of the Earth and the Environmental Protection Agency praised this decision. The District also decided against the expensive plan of transporting the sediments to upland areas. And a plan to use the material for creating artificial marshlands aroused opposition from the National Oceanic and Atmospheric Administration which protested the loss of subtidal land. Even the final, expensive solution of dumping the sediment in deep water was opposed by those who wanted to increase waterfront sites for business expansion. The frustrated Grays Harbor Chapter of the Northwest Steelhead and Salmon Council commented, "There is no safe place for the dredge spoils in inner or outer waters." The Division's decision to select the most expedient and least controversial alternative of deep water disposal constituted a compromise among local interests, environmental groups, and state and federal agencies. Still, the Division had taken the initiative in environmental studies, refusing to respond to pressure to begin dredging the new channel until adequate studies had been made. In this decade of new environmental regulations and pressure groups, the Corps and the Division had established institutional and interagency procedures that reflected a national mandate.¹⁶

2. Fish And Wildlife Mitigation

In the 1970s protection and mitigation of fish and wildlife losses were clearly the most sensitive and well-publicized of any programs of the North Pacific Division. The decade represented a crucial point in the anadromous fish program with completion of new hydroelectric projects and threatened depletion or even extinction of some fish runs. In 1969 Edward M. Mains, the Division's Fish Research Biologist, summarized the Division's position on fish and wildlife matters. He pointed out its deep involvement and heavy financial commitments in this area as evidenced by its \$134 million investment in fish and wildlife facilities and another \$50 million authorized. Through the Fisheries Engineering Research Program which Mains headed, the Division had spent \$4.5 million on fish research. The Division was entering a new age in anadromous fish facilities. Because of extensive hydroelectric and flood control systems, it could no longer be content with obsolete or just fairly good systems if the anadromous fish resource was to be maintained. Mains stressed that collective small losses at a large number of projects imperiled the runs, making it necessary to add protective measures at all points in the river system and at the older projects. In order to protect fish runs, the Division needed funds, plans and authorization from the Chief. It also required greater awareness at all echelons within the Corps and among Congressional committees that substantial amounts of money would be essential to modernize fish facilities at older projects and to correct problems such as water pollution.

Despite its considerable involvement in fish engineering and research, the Division was not certain of its authority in fishery enhancement where it was not specifically authorized. Further, it did not know the correct procedure for adding enhancement at projects completed before the 1958 amended Fish and Wildlife Coordination Act. "In fact," Mains observed, "there is no clear guidance available as to the degree we may cooperate with the state fishery agencies . . . even when the state is willing to stand the majority of new costs and all that may be required of the Corps is some operational cooperation." He emphasized that above all the Corps "in its concern for improving its conservation image should make a strong effort to recognize its fish and wildlife mitigation obligations and shortcomings and the potential for the enhancement of these resources at its projects." Mains recommended that all levels of the Corps should "initiate an action program" consistent with its authority. When that authority was in doubt, "the Corps should assume a role of leadership in clarifying this authority and seek new authority where needed." He concluded, "We should not and need not be placed in a defensive position by the conservation interests on such matters."¹⁷

The Corps' issuance of two regulations on cost-sharing for fishery enhancement in 1970 heightened the Division's concern over the agencies lack of commitment or understanding of the anadromous fish problem. These regulations threatened flood control projects on smaller tributaries because local agencies could not share the costs and some projects could not be justified without the fishery enhancement benefit. In addition to the effect of these regulations on national goals of water resources development, General Kelley believed there were compelling reasons for federal financing of anadromous fish enhancement programs. Because the fish were harvested over a wide area, he contended that local contributions toward their production were somewhat illogical and certainly impractical. Kelley also protested the Chief's publication of regulations that had great impact on field operations, relations with the states, and all fish and wildlife agencies without first consulting the field offices to determine the magnitude and gravity of the impact resulting from the regulations. He advised General Clarke that the regulations significantly affected the problem of interagency relations and belied the Division's claims of environmental interest and responsibility. He warned that the cost-sharing requirements could mean the end of Corps work in many streams in the Northwest. In Kelley's opinion, the regulations had gone considerably beyond the intent of the laws.¹⁸

At the same time the Corps was resolving its proper role in fish mitigation, environmentalists and sportsmen vigorously portrayed the Corps as a destructive and callous organization. The publication of a harsh article in *Outdoor Life* in 1972 generated critical letters from the public and from congressmen. The Division prepared a position statement protesting its characterization as a huge unseeing, unfeeling machine dedicated to building dams wherever there happened to be dam sites. On the contrary, as General Sawyer explained, 69 percent of the Division's work force enjoyed outdoor recreation and 25 percent belonged to conservation groups, including the Sierra Club and the National Wildlife Federation. The Division also had nine aquatic biologists and several recreation specialists and landscape architects. Among the various programs aimed at protecting the environment, Sawyer listed the awards for project designs that protected natural beauty; funding of anadromous fish research; zoning and

acquisition of land for wildlife; improvement of water quality through flood control and low water augmentation; research on the effects of releasing water from reservoirs on fish runs; creation of fishing and recreational areas; and a \$200 million investment in fishways and fish hatcheries that cost \$2 million for annual operation and maintenance. Sawyer explained the Division's readiness to cooperate with others in protecting and enhancing environmental values while also developing water resources. He remarked that the true meaning of conservation was wise use. While "many people understand development and preservation as opposites, I don't believe we will abolish controversy on these matters and would not advocate it," he stated. He urged open communication that placed factual information and emotional issues in proper perspective.¹⁹

A critical test of the Division's ability to respond quickly to environmental problems was the well-publicized nitrogen supersaturation problem. The first incidents observed in Pacific Northwest slack water occurred in 1965. Then in spring 1968 massive fish kills were reported below John Day Dam where the water was being released over the spillways because the turbines were not yet operational. Only later did scientists determine that passing water through turbines prevents it from becoming supersaturated with nitrogen. As late as August of that year, the Division believed the cause of mortality was not yet clear while the news media concluded the dam was at fault, pronouncing the fish runs doomed. In defending the Division's position, General Yates explained that completing the power units and diverting water through the turbines would alleviate the problem. He also suggested that the fishery agencies might be generating publicity in order to strengthen opposition to the controversial Ben Franklin Dam and to win support for more research funds.²⁰

A year and a half later, the Division still did not understand completely the connection between nitrogen supersaturation and high mortality of juvenile and adult salmon at John Day and Chief Joseph. Reducing the amount of water spilled was thought to be a sufficient precaution. Others, including environmentalists, also experienced difficulty in pinpointing the cause of the fish losses. A scathing article in *National Wildlife* blamed the Columbia and Snake River dams for fish mortality because of mechanical blockages and physical harm to the fish.²¹

In early 1970 the Division hired a contractor to research the problem more thoroughly. In addition Division personnel met with representatives of the National Marine Service Biological Laboratory to discuss the Services' proposed research and testing program in which juvenile salmon would be transported to the lower Columbia, bypassing the dams. The Division authorized Walla Walla District to immediately release \$20,000 from the Little Goose project for this work.²²

In May 1970, sportsmen alerted Washington State Game personnel and the Walla Walla District biologist to the presence of dead fish in the Lower Monumental reservoir and in slack water around the mouth of the Snake. On May 29, 1970 at a meeting with the Federal Bureau of Commercial Fisheries, the District learned that the dead and injured fish showed signs of the gas bubble disease. Those in attendance agreed the likely cause of the fish kill was nitrogen supersaturation produced at the spillways of the newly completed Little Goose Dam. Again, the District felt that the completion and operation of all the units at Little Goose and the completion of the new Dworshak Dam to take the head off high spring flows would solve the problem. As the season continued another fish kill occurred in the Ice Harbor reservoir, with the dead fish

showing the same symptoms of ruptured skin. A total of 2,172 dead were counted, 90 percent of which were adult bass. The Washington Game Department estimated that as only 5 percent of dead fish appear on the water surface, the total number was probably around 43,000. The Bureau of Commercial Fisheries added that from 30 to 50 percent of the Snake downstream migration might have been lost. Other criticism quickly followed. The Game Department charged the Walla Walla District with ignoring its repeated warnings about the potential effects of nitrogen supersaturation. "I can, therefore, only conclude that it is the policy of the Corps of Engineers to expect people generally to understand that these fish losses are a natural by-product of the construction and operations of these dams," Director John A. Biggs wrote to the District. Biggs also reminded the Division that the Corps was responsible for those fish losses and would be expected in the near future to pay for and construct hatcheries to compensate those losses. "It will be our intention to pursue this claim as being a valid one against the U.S. Government," he sternly warned. "We cannot and will not condone a continuance of these fish losses."²³

The adverse publicity on the losses quickly reached the attention of the Chief's Office which urgently requested a detailed report on the fish kills. Publicity on the summer fish kill also provided the Association of Northwest Steelheaders with new evidence in their lawsuit seeking to prevent construction of Lower Granite Dam. It was rumored in the Pacific Northwest that the Washington Game Department intended to file a million dollar lawsuit and join the steelheaders in their suit. Walla Walla District immediately began investigating the patterns, levels and effects of nitrogen supersaturation.²⁴

After fall 1970 staff meetings, the Division requested district engineers to examine the effects of each of their projects on nitrogen saturation levels and to report on-going research, plans and costs for obtaining the necessary data.²⁵

While the districts intensified their research and data collection on the nitrogen supersaturation problem, fish and game agencies continued to demand action. The Bureau of Commercial Fisheries reported to General Kelley that losses of juvenile anadromous fish on the lower Snake might have been as high as 70 percent. It suggested a number of solutions, including trapping and transporting downstream migrants to the lower Columbia, installing all the turbines in the lower Snake River dams, modifying spillway designs and operations, and developing a plan to compensate for the losses due to the construction of the four Snake dams. The next month General Kelley responding to a series of letters protesting the fish kills, reaffirmed the Division's commitment to finding a solution. He hoped fishery agencies would assume joint responsibility to help fund corrective measures and secure money from Congress. In the meantime, the Division proceeded with plans to install turbines ahead of schedule to minimize spilling water. It also formed a Nitrogen Study Coordination Committee composed of district and division personnel. What it was not prepared to do was suspend construction on Lower Granite.²⁶

By early February 1971 the Division's nitrogen study group had designed and tested a mathematical model for predicting nitrogen levels. The group was also designing other models and implementing long-range studies on all the Columbia reservoirs. A few months later the Division formed a second task force that included fishery agencies and representatives from the Bonneville Power Administration and the Environmental Protection Agency. While also investigat-

ing reservoir regulations to control nitrogen levels, its specific concern was coordinating the release of high water with the hatchery releases of salmon and steelhead. The task force also formulated a plan to redistribute power loading in order to pass water through the lower Columbia and Snake River dam turbines and avoid spilling water. These were temporary measures to be taken until permanent solutions could be found. In spring of 1971 engineers tested a slotted bulkhead or orifice gate installed in intake units. This device allowed excess water to be discharged through skeleton bays at the dams. Nicknamed the holy gates, each bulkhead contained 60 openings six inches high by five feet wide. The engineers installed the first three prototypes at Little Goose that year. The costs were high, but the results seemed encouraging as nitrogen levels were drastically reduced. The Division then went ahead with plans to install others at Ice Harbor and Lower Monumental. During the test period, local groups and agencies anxiously monitored the results and attempted to obtain more funding.²⁷

Another experimental solution tested in late 1971 was a spillway deflector called a flip lip. Extending outward from the spillways in a shallow arc just below water level, they deflect the rushing water horizontally, preventing the deep plunge into the pool that creates supersaturated water.

Division Engineer General Sawyer was confident that these devices would be successful, but fish mortality showed the holy gates and flip lips inadequate. He then invited federal agencies to review the Division's research programs on reducing and controlling levels of the gas. The interagency meetings produced immediate cooperation through an agreement on responsibilities, including financial, for the program. The participants also prepared guidelines for the Division's technical advisory group which included representatives of state and federal power agencies. They agreed with the Division on the necessity of working out a rational plan for solving a difficult and costly problem. As Sawyer reported to the Chief of Engineers, "Our effort is to keep a lid on this seething pot so that we can all do what must be done to solve our common problem within an atmosphere of as little emotionalism and as much common sense as it is possible to attain. We find our fisheries associates aligning with us to restrain the environmental groups who would push for actions likely to be premature and perhaps costly and unnecessary."²⁸

Fishery agencies were not the only ones involved in the issue of nitrogen supersaturation. The Oregon Department of Environmental Quality openly and sharply confronted the Division regarding who should have the final authority in deciding matters of water quality. In February 1972 the Director of the Oregon Department of Environmental Quality, L. B. Day, proposed establishing a maximum allowable level of dissolved nitrogen in Oregon's public waters, both inter- and intrastate. The Division perceived this as a serious challenge to the Corps' and the Federal Government's legal responsibilities under the National Environmental Policy and the Water Quality Improvement Acts. The Division maintained that the projects were in Washington as well as Oregon. Therefore federal jurisdiction over navigable waters superseded states' rights. Moreover the level of permissible waste could be construed as "capricious," Oregon would not be able to enforce the regulations and, finally, the proposed standard appeared to have loopholes. As Division counsel Darwin K. Anderson explained, "We want to hold the saturated nitrogen to the lowest level reasonably possible. But we cannot let L. B. Day expand authority into that [sic] he does not have." The

Oregon Department proceeded with a public hearing on three water quality measures, and it announced plans to require the Corps to apply for a state permit for waste discharge under the proposed regulation limiting dissolved nitrogen concentrations to 110 percent of saturation. Realizing the sensitive nature of the issue, the Division attempted to avoid a public squabble with Day. An internal memorandum summarized the situation, "How to be the Pollution Good Guy and Get the White Hat from L. B. Day While Telling the State We Can't (Won't) Apply for a Permit." The white hat was needed to counter press coverage which liberally quoted environmental writers and groups opposed to dams and dam builders, and promoted the image of the state as the "little guy" challenging the government "big guy." Responding to the negative press coverage, the Division advised its Public Affairs Office to concentrate on goals and newsworthy positive actions or statements rather than on negative items like unwillingness to apply for a state permit. "We should try more to 'Make Favorable News'." an internal memorandum advised. Donald Cox of the Operations Division cautioned that the Division should not ignore the possible reduction of fish runs attributed to high levels of nitrogen. He recommended issuing periodic bulletins on the spring fish runs, adding, "Nothing to lose here - if it's bad, we might as well announce it ourselves; if it's good, we win." Cox's final suggestion was to write Oregon Governor McCall on the permit question before the state took a formal position in order to avoid a major confrontation with Day.²⁸

In discussing the best course of action to follow in the disagreement with the Oregon Department of Environmental Quality, the Division stressed that the conflict was really between the State and the Environmental Protection Agency. In its opinion, the Water Quality Act of 1970 governed the actions of federal agencies in complying with state water quality standards. Consequently, the Corps and other federal agencies should comply with state standards only if the standards had been approved by the EPA. Where differences existed, the Corps would be obliged to follow the EPA standard. Further, because the Corps was the agency responsible for issuing discharge permits, it had never issued a permit covering its own activities. The Chief's office counseled, "Do not apply to yourself for a permit." It ruled that decisions on water quality standards should be based on an environmental impact statement to best insure a true view of alternatives instead of uncertain projections and unquantified assumptions.²⁹

The Division emphasized above all the need for close, friendly cooperation among all agencies and for encouraging agencies to expand their own efforts to determine more facts in their areas of expertise. As Deputy Division Engineer Colonel Arthur R. Marshall further stressed, "As more facts are developed, so will our joint ability to deal successfully with any other as yet unknown fisheries problem which might arise in the future." Meanwhile, combative L. B. Day continued his efforts to force the Corps to comply with Oregon's water quality standards, even if it meant court action. He thundered to the press that the Corps of Engineers represented environmental concerns like Dracula represented vegetarians and charged that the agency had been totally uncooperative. He set September 1 as the deadline for submitting a compliance schedule.³¹

While Day was publically denouncing the Corps, the Division continued working on the nitrogen supersaturation problem. During spring 1972 federal and state agencies and private utilities forged a united front for collecting data on

nitrogen supersaturation. The National Marine Fisheries Service studied the effects of varying concentrations of dissolved nitrogen on young fish, and the regional director of the Environmental Protection Agency agreed to develop a regional standard acceptable to state and federal governments. At a May 6 hearing federal and state fisheries and ecologists praised the Corps' efforts and cooperation. In anticipating the spring upstream migrations, and at the request of other agencies, the Division reduced flows on the lower Columbia River below Bonneville.³²

That spring the large downstream migration of spring chinook salmon coincided with a large fish kill below the three Snake River dams. For over a month the migration of juvenile fish had proceeded extremely well, but on May 9, 1972 the Washington Department of Game reported about 1,500 dead fish below Little Goose. Subsequent investigations discovered more dead fish below this dam and Lower Monumental. Although the slotted bulkheads had substantially reduced nitrogen supersaturation levels, the fish injured themselves as they swam through the holes. A few days later after observing test fish passing through a slotted bulkhead, fishery agencies concluded that these devices were responsible for the kill. Federal and state fishery agencies recommended closing six of the bulkheads at Little Goose, three at Lower Monumental, and all nine at Ice Harbor. Walla Walla District complied the same day. Further investigations showed that fish kills were much higher than originally estimated, perhaps as high as 50 percent. All the slotted bulkheads were then temporarily removed, to be put back in operation after the spring migration was over in order to minimize nitrogen supersaturation for the summer upstream migrations. In explaining the decision leading to installation of the slotted bulkheads, the Chief's Office explained that this crash program had been adopted based on a consensus among the governors of three states in 1971 and upon recommendations of other federal and state agencies. While recognizing that the bulkheads might kill some fish, the fishery and environmental agencies, without reservation, had recommended them in order to preserve the fish runs. "It is true that our design might have been different had we taken another year for testing," the Chief's Office explained to Oregon Senator Bob Packwood, "but the consensus of responsible officials was that we could not wait." In the meantime the Corps pursued studies on spillway deflectors, flip lips and water bypass systems that would avoid spilling water and entrapping the nitrogen. Fish kills from nitrogen supersaturation were not confined to the Snake and Columbia. A year later in March 1972, a high discharge of water over Dworshak Dam, occurring at the same time the hatchery shut off its aerating equipment, precipitated a fish kill. However, Idaho cleared the Corps of culpability in this matter.³³

That summer an exceptionally large downstream migration and the return of a large steelhead run, originally feared to have been almost totally destroyed by nitrogen supersaturation in 1969 and 1970, compensated for the failure of the slotted bulkheads. Then, after a July meeting with General Sawyer and Portland District Engineer Colonel Paul Triem, Day agreed to suspend state action while the Division and Day's department worked out a memorandum of understanding. A final agreement was reached when the EPA announced its plans to write a water quality standard for the region. During this dispute, the Division's success in cleaning up the Willamette River impressed Day, and he publically gave his support to flood control projects which would augment low



Hand-loading fish into a tank truck for transport to the Operation Fish Run barge, 1977.



An Operation Fish Run barge, 1980.

flows. An accord appeared to have been reached at last on setting water quality standards and forging an alliance between Oregon and the Corps.³⁴

The Division finally achieved control of the levels of nitrogen supersaturation with the installation of flip lips, the concrete devices that deflect spillway water. Tests in 1973 showed a substantial reduction in the supersaturated gas, and inspection of tagged fish found no damage to adult or juvenile fish. The installation of flip lips continued through the 1970s as the Division studied and constructed other devices to protect the migrating fish. These included improvements to fish screens and bypass systems for juvenile fish. Another idea discussed in the 1972 issue of the Corps' journal *Water Spectrum* was underwater speakers generating sonic patterns to keep fish away from intakes. "Although it may be grasping at straws," the Division noted, "acid rock music does, apparently, affect fish as it does some of us."³⁵

Begun in 1968, Operation Fish Run proved to be a highly successful method of passing fish around the dams. The National Marine Fisheries Service initiated the program of trapping fish at Ice Harbor and shipping them by truck to the Columbia, either below John Day or Bonneville. In this way the fish avoided the turbines and predators such as squawfish and sea gulls. Apparently trucking the fish did not destroy their homing instincts. The Division estimated that 20 percent more of the transported fish returned upriver compared to those migrating naturally past the dams. A mortality of one percent during transport and high return rates of the trucked fish convinced the Division to establish its own program of trapping and transporting juvenile salmon and steelhead trout. The Division first undertook the program as a temporary measure until other facilities and hatcheries could be constructed as part of the Lower Snake River Compensation Plan. However, the documented success of Operation Fish Run after the completion of the lower Snake River dams led to its continuation and expansion in 1975. During the drought of 1977, barges and even an air tanker were put into service. As part of the effort, federal agencies and private utilities released

water to simulate the normal spring freshet, allowing fingerlings to pass safely over the dams.

The fish transport program uses traveling fish screens to direct the fish into collection areas where they are carefully loaded into barges or tanker trucks. The Division has added barges to its tanker truck fleet in order to transport a greater number of fish. The tankers are equipped with a circulation system that guarantees an adequate supply of oxygen. Compared to the barges which can transport either 350,000 steelhead or up to one million chinook salmon, the trucks hold only 25,000 to 30,000 smolts. The air tanker is no longer used. In October 1980 the project transported 7,868,000 salmon and steelhead smolts, 6,118,000 of them from the Snake River. This was over 2.5 million more than the record shipment of 1979. Barges transported approximately 60 percent; trucks carried the rest. The Division optimistically reported that except for sockeye salmon, downstream migrations of both wild and hatchery fish were good, and the transported fish appeared to be in excellent health, suffering no ill effects from their journey. With a new fish barge to be delivered in March 1981, the prognosis was bright for continuing the program.³⁶

Operation fish run provided valuable data on fish survival. Smolts collected for transport were marked by a freeze brand, clipped fin and coded wire tag. By using these marked fish as a control group, researchers were able to determine the numbers of fish species returning to spawn upriver and to estimate the affect of fish screens and other obstacles on the fish not barged or trucked past the dams. Although by 1980 scientists had discovered no single reason to account for low return rates, the evidence indicated heavy mortality in the Columbia River estuary or early ocean mortality. Another puzzling fact was that good downstream runs did not always produce high return rates. It was thought that factors downstream from the Snake River dams might be the cause. Spring runs of chinook salmon in 1980 appeared to be suffering the greatest reductions.³⁷



Site of the controversial Lower Granite dam on the lower Snake River.



Fish ladders at Lower Granite dam, 1975

3. Lower Snake River Projects and the Fish and Wildlife Compensation Plan

The completion of Lower Granite Dam and dedication of the Inland Passage in 1975 brought exuberant praise from shippers, businessmen and the newspapers. Idaho Senator Frank Church remarked at the dedication, "Creating a seaport as far inland as Idaho is a dream so large that it rivals the greatest engineering projects It is an achievement so exceptional that envious communities elsewhere will forgive us as we all go aboard this month's pleasure cruise on the waters of self-congratulation." Washington Senator Henry Jackson was more restrained in reminding the audience that just as the project had brought about "new jobs, new incomes, new people, and new lifestyles," there would also be problems of land use and competition for resources. Idaho Governor Cecil Andrus, the least buoyant of the official dignitaries, bluntly stated, "Before I accept this structure, I want to point out that the cost of this system has been horrendous, both in dollars and in cost to our natural resources."³⁸

The long-awaited dream of the Inland Passage, a constant theme in the history of water development in the Pacific Northwest, emerged in the 1970s encumbered with warnings, disputes, and even lawsuits. Behind the optimism of a new transportation and commercial boom at Lewiston, Idaho's new seaport, arose questions and controversy over the effect of the four-dam system on the ecology of the lower Snake River. Fears of a declining or even extinct fish run fueled sharp criticisms of the Corps and led to a well-publicized lawsuit by "steelheaders" who sought to prevent construction of Lower Granite. The press printed scenarios of people losing their homes and their way of life as the Corps seized houses, orchards and lands. A less well-publicized event, the Lower Snake River Fish and Wildlife Compensation Plan, was also a part of the history. Based on interagency research and



Idaho Governor Cecil Andrus at the dedication ceremonies for Lower Granite dam and completion of the Northwest Inland Passage, June 19, 1975.

coordination, this plan for mitigating fish and wildlife habitat represented a unique effort to develop and implement a comprehensive plan directed toward resources and needs that the early promoters of the Inland Passage could not have anticipated. The lower Snake River, the last major water route of migratory fish to be developed in the late 1960s and early 1970s, became an important forum for fishery agencies and environmentalists. For many, it symbolized the final threat to the fish runs. It also provided an opportunity for the Federal Government to make good its commitment to fish and wildlife conservation.



Unlike solutions for nitrogen supersaturated water, compensation for loss of fish and of fish and wildlife resources was significantly more complicated, controversial and expensive. No one had considered the possibility of supersaturated water until the discovery of large fish kills brought it dramatically to the fore. But the solution to the problem was essentially a mechanical one of reducing levels of the gas by changing or deflecting spillage over the dams. The immediacy of the situation led to a concentrated effort among several agencies, states, and utility companies to aid research efforts and solve the problem. The reduction in fish runs, however, was a more gradual process with peaks and valleys occurring throughout a general decline of returning fish. A tabular summary of chinook salmon and steelhead migrating upstream over Ice Harbor Dam from 1962 to 1975 revealed fluctuations as high as 38,000 from year to year within the general pattern of decreasing numbers. As an indication of the seriousness of the problem, from 1962 to 1972 spring chinook runs decreased from 33,613 to 21,400; summer chinook from 30,639 to 7,200; fall chinook, 30,000 to 2,600; and steelhead from 115,795 to 15,200.³⁹

Ironically, the early reports of record fish runs in spring of 1970 and 1972 were followed by the large fish kills from nitrogen supersaturation those same years. In early May 1972, the Portland District Engineer enthusiastically reported 173,769 chinook salmon passing Bonneville, surpassing the previous record of 173,562 in 1969. Some questioned the reliability of the fish counts, charging that many of the fish were counted twice at Bonneville. These "fallbacks" that had not succeeded in ascending the fish ladders on the first attempt could account for as much as 30 percent of the run. Others noted that fish counts from one dam to the next did not tally.⁴⁰

There were many reasons for the decline of fish runs. Pollution, blockage of spawning streams, unscreened irrigation ditches, increased catches by commercial trollers and sport fishermen, and the completion of dams on the Columbia and Snake all took their toll on migrating fish. A lack of reliable data was a major obstacle to analyzing the problem and developing solutions. Data on commercial catches was not

available until the early 1950s and figures for sport fishing not until the 1960s. Although experts disagreed over the source and extent of the problem, the Columbia and Snake dams were identified as a major cause.

Since the 1930s the Division had been involved in research, funding and constructing facilities to conserve fish runs. This activity included participating in the interagency Fisheries Engineering Research Program. The Division, other agencies, and experts knew the lower Snake River dams would raise barriers to the spawning streams in Idaho as well as to downstream passage to the Pacific. Many feared that fish runs, already reduced by the Columbia main stem dams, could not survive the additional stress of bypassing four more on the lower Snake. In 1975 fishery agencies and the Corps estimated that 48 percent of fish migrating from above Lower Granite to below Ice Harbor would be lost with the completion of Lower Granite.⁴¹

Much of the concern focused on the anadromous steelhead trout, the principal game fish in the reservoir below Lower Granite and upstream to the Clearwater above Lewiston. Although salmon do ascend into these stretches, they usually arrive in poor condition from the upstream journey and are not interested in feeding. In the late 1960s fishery groups studying the effect of the new dams and upstream reservoirs on game fish noted that the projects would raise water temperatures, slow migration, and expose the fish to predators. In May 1969 the Walla Walla District formed a steelhead study group composed of representatives of the Tri-State Steelheaders, the U.S. Bureau of Sports Fisheries and Wildlife, the U.S. Bureau of Commercial Fisheries and the Washington Department of Game. In addition, the Division formed its own steelhead research program as part of the well-established Fisheries Engineering Research Program. A major goal these groups shared was how to improve steelhead fishing in the lower Snake reservoirs. This concern with sport fishing revealed the importance of recreational and social values. Some of these efforts to improve fishing involved sonic tracking of steelhead and salmon and testing of fishing methods in the reservoirs. The larger areas created by the

The Sternwheeler *Portland* at opening ceremonies for the Northwest Passage, June 19, 1975.

dams make fishing more difficult, but because migrating fish travel fairly well-defined paths, a tracking system could aid fishermen in locating the migration points.⁴²

Not all sportsmen and fishing groups were satisfied with the Division's efforts, notably the Association of Northwest Steelheaders which declined to participate in the steelhead study group. In August 1969 General Kelley confided to District Engineer Colonel Giesen that some of the Northwest fisheries agencies were not enthusiastic about the proposed work. They were concerned about the handling and tagging of fish for the investigation and questioned the working of the study. He recommended a greater effort to demonstrate that the study was a tripartite effort, including fishery agencies, fishermen, and the Corps of Engineers rather than a Corps only program. After conducting a study at Ice Harbor reservoir in fall and winter of 1969-70, the District reported that fishing catches had increased.⁴³

The next year the Steelheaders Association petitioned the U.S. District Court in Spokane to halt construction of Lower Granite and the proposed Asotin dam. The Association claimed that the projects violated the Fifth and Ninth Amendments to the Constitution and the 1969 National Environmental Policy Act. It also alleged that the Corps had not held hearings on the authorizations, did not report certain objections, misrepresented and underestimated costs, overestimated benefits, failed to take proper account of the effects of construction on the environment, and finally, "were generally negligent, deceitful and presumptuous in dealing with the projects." The court denied the request for a temporary restraining order but set a hearing for June 2, 1970. The Division countered this action with its own petition to dismiss the charges, arguing that it had "discharged all obligations imposed upon them under law" and asserting that the plaintiffs had no standing to sue. The court made no ruling but ordered pre-trial procedures, setting aside the June 2 date.⁴⁴

In bringing a legal suit against the government, the Northwest Steelheaders hoped to delay construction long enough to investigate alternative sources of energy that would

leave untouched this stretch of free flowing river. The lawsuit placed the Division in an awkward position. Congress had authorized the Snake River project of four dams in 1945, and the Corps had expended considerable time and money on mitigating fish and wildlife losses. This included \$5 million in fisheries research and more than \$170 million in fish and wildlife facilities in Washington, Oregon, Idaho and Montana, \$38 million of which was used for fish facilities on the lower Snake River. In response to the charge that the Corps had failed to comply with environmental legislation, the Chief's Office pointed out that all four dams contained fish passage facilities and that the Lower Granite project had been begun before enactment of the 1969 National Environmental Protection Agency legislation. Moreover, Congress had authorized and funded the Lower Granite project for additional hydropower, and local agencies had invested in shipping and other commercial facilities contingent upon slack water to Lewiston. Consequently, the Chief's Office advised the Senate Appropriations Committee that delay at Lower Granite could be costly. On the advice of General Kelley, the Office affirmed the Corps' intention to award the contracts and continue construction despite the lawsuit.⁴⁵

The parties in the suit were nearing an out of court settlement when the May 1970 fish kill from nitrogen supersaturation occurred, halting the process. "The plaintiffs are getting considerable added motivation from an unfortunate development," Kelley reported. Then compounding the situation, the Washington State Game Department joined the suit against the government. The Inland Empire Waterways Association tried to persuade Governor Evans to rescind the action by appealing to the need for hydroelectricity and pointing to navigation and shipping investments already made in the area. It pointed out that many area residents who used the Snake for recreation, particularly the members of the Tri-State Steelheaders Association, did not support the lawsuit. Its primary argument was economic, based on the loss of several hundred jobs in construction, loss of income by the surrounding communities, and loss of future tax revenues. Although the Waterways Association did not convince Evans to withdraw from the suit, the Walla Walla County Republican organization forced him to issue a press statement explaining his action. He contended that he saw the suit as a means of obtaining adequate provisions for protecting fish and game.⁴⁶

The suit was not against just the Corps of Engineers; in a larger sense, it was an indictment of the Federal Government. In fall 1970 Jack Hemphill of the Interior Department's Bureau of Sport Fishery and Wildlife promised to help the Walla Walla District prepare documents for the trial. In the meantime, General Kelley asked the Bureau to expedite its report on the impact of the Snake projects on fish and wildlife resources and its recommendations for additional mitigation. The Division was anxious to resolve differences with the Bureau and implement an action program. Worrying that further delay would cause considerable embarrassment and public castigation of both agencies, Kelley proposed a joint meeting with the Bureau's Regional Director and the Walla Walla District.⁴⁷

In its case against the steelheaders, the Division contended it had consulted with the State Game Department through the Fish and Wildlife Service. It maintained the 1958 Act did not require the Division to fund studies by state agencies and that its plans did provide adequate mitigation for game losses. Above all, the Division wished to avoid any assertion of state or judicial right to direct its planning and

allocations. When in spring 1971 the Northwest Steelheaders Association pressed for a public hearing on the project's environmental impact and requested a copy of the mitigation plan, the Walla Walla District and the Division advised the Chief's Office against complying. Then in April the steelheaders expanded the lawsuit to include additional construction at the three other Snake River dams which they charged also violated the Fish and Wildlife Coordination Act. The suit further requested that the Snake River from Asotin to Almoda be declared a natural preserve, thus precluding any future construction.⁴⁸

As the court date approached, the Division filed the final Environmental Impact Statement for Lower Granite Dam along with other environmental and water quality reports which it hoped would give evidence of reasonable and sincere progress. At the time of the court hearing in November and with construction of Lower Granite one-third complete, the U.S. Attorney's Office began considering the suit and the Corps' counter motion. On December 14 the court granted the Corps' motion to dismiss on the grounds it lacked jurisdiction to determine what course Congress should follow. In its opinion, the Federal Government did not consent to be sued. The court also based the decision on the Corps' willingness to begin negotiating with the Washington Fish and Game Department on mitigating fish and wildlife losses. The Steelheaders Association appealed the case to the Ninth Circuit Court in San Francisco, an action that their national headquarters in Denver supported and financed. Almost two years later, the circuit court reversed the decision to dismiss the case, returning it to the district court. After several hearings, the court in 1977 finally ruled for the Corps on the grounds that the issue had become moot for the reason that the four dams on the lower Snake River had been constructed and were in operation. However, the judge did order Walla Walla District to file a special report on the compensation plan.⁴⁹

The Lower Snake River Compensation plan, like similar projects undertaken by the Division, was authorized by the 1958 Fish and Wildlife Coordination Act. This act requires federal agencies responsible for the loss or degradation of habitat to provide compensation. As required by the act, the U.S. Fish and Wildlife Service submitted separate reports to the Division on the first three dams; then, in 1966, Walla Walla District requested the Service to prepare one report that would consider all four dams as a single unit. Completing the report assumed a special urgency during the steelheaders lawsuit as the lack of a comprehensive report and mitigating plan prevented the District from responding fully to the charges or initiating mitigation measures. In the meantime, critics and the press denounced the Corps for its perceived indifference toward the environmental resources on the lower Snake. After receiving the final report on the Snake project in 1972, the District prepared a draft with specific proposals for constructing hatcheries for migrating and resident fish. Under the plan, the District would also provide access to fishing sites, improve fish passage facilities and transportation of juvenile fish, and acquire land or easements for wildlife habitat. The costs were expected to be high. Walla Walla District estimated \$46 million for the compensation measures and \$3 million for annual operation and maintenance costs. This was in addition to the \$52 million expended on mitigation programs previously completed. The compensation plan, public hearings, and agency and public review constituted a unique endeavor to provide a comprehensive, long-range plan for fish and wildlife within a specific geographic area. It reflected the Division's

past experiences in forming interagency coalitions, its research endeavors such as the Steelhead Research Program, and the intensified environmental movement. The draft plan recommended four hatcheries for raising 4,900 spring and summer chinook salmon, 4,580 fall chinook salmon, 6,780 steelhead trout, and 98,000 pounds of rainbow trout, and creating 150 miles of access for fishermen. The second part of the plan on mitigating wildlife habitat and population was necessary because the dams had inundated habitats on the rich bottomlands and along shorelines of the steep Snake River canyons. It proposed replacing losses of some species like snakes and gophers with others deemed more desirable. The proposal to substitute lost habitat with land from private owners on a willing-seller basis touched off a heated controversy.⁵⁰

The hearing testimony indicated general acceptance of the hatchery plan. As one speaker commented, "The Corps has already spent a vast number of dollars, many millions, to repair the fish runs, and I think everybody is in favor of that." Others objected to overfishing by commercial operations, and replacing the more elusive wild fish in a free flowing stream with easily caught hatchery fish. The Tri-State Steelheaders demanded that the mitigation provision for hatcheries, planting fish, and granting access to fishermen be substantially increased. The Northern Rockies Chapter of the Audubon Society submitted its resolution that the Corps restore the salmon and steelhead runs to the level which existed prior to construction of Ice Harbor Dam.⁵¹

Although the Walla Walla District was aware of many viewpoints of its critics, angry protests against the wildlife mitigation proposal caught it unprepared. Farmers and landowners turned out in large numbers at the Dayton and Colfax, Washington, meetings to oppose the government plan for procuring private land for wildlife habitat. They succeeded in making an impression. Colonel Conover admitted to one of the participants, "I feel sure there will be some revision and I feel sure it will take place largely because we got an entirely different side . . . Personally I think that's very healthy."⁵²

Although the Corps had announced its intention of obtaining land only on a willing-seller basis, people remembered other instances in which owners had been forced to sell. One well-publicized case was that of "Snake River John" whose farmland and orchards had been acquired through eminent domain for the Lower Granite project. The *Seattle Post-Intelligencer* used the occasion to characterize the Corps as whipping "a little fellow like him" by cutting down his orchard, ruining his hog business, and refusing to give him a fair price for his land and granite deposits.⁵³

Many other owners of land and orchards along the fertile bottomlands lost their property, their livelihood, and their way of life to the Lower Granite project. The experience of watching bulldozers topple houses and fences and uproot trees, and the disappearance of whole communities reinforced the groundswell of resentment against the Federal Government. Those who did not lose their land to the projects resisted giving up any portions of their holdings for wildlife habitat or for access to hunting and fishing sites. Farmers were adamant in their opposition, blaming the Corps and other agencies for favoring wildlife over farming. They stated that wildlife losses were confined to rattlesnakes and coyotes, and that increasing habitat on areas adjoining farmland would only attract wildlife to their fields and spread noxious weeds. Many local hunters opposed the plan, contending that wildlife losses were due more to the exploding coyote population and long hunting

seasons than to lost habitat. The deepest resentment was expressed over the right of any government to seize private land, forcing taxpayers to subsidize recreation.⁵⁴

The large crowds at the hearings and the arguments against wildlife mitigation convinced Colonel Conover that the plan would have to be revised. At the end of the Colfax meeting he remarked, "I really don't think I'm a very stupid man, but I'd have to be an awfully stupid man if I didn't get the message that a helluva lot of people were concerned. That's been recorded, and I pledge to you that your real concerns will be considered . . . I'm not going to just whip out a report to get it off my back. I'm going to recommend what I believe to be right."⁵⁵

Assembling all the information into the final plan proved to be a large task, and selecting appropriate hatchery sites the most difficult. In January 1974 fishery agency representatives formed an interagency Hatchery Siting Subgroup and asked Walla Walla District to fund field and research work. Meanwhile, below average spring and summer salmon counts on the Columbia threatened to set a mark for the smallest runs on record, forcing the states to close the runs to commercial and sport fishing. Alarmed, Division Engineer Maj. Gen. Richard E. McConnell advised immediate aid for the summer chinook in order to preserve the specie until the compensation plan could be implemented. Even the steelhead runs, previously thought to be plentiful, suffered during the 1974 drought. Fish and game officials met in October to propose emergency measures for the Walla Walla District, including collecting and transporting steelhead smolts, screening turbines, constructing spillway deflectors, spilling water during the fish migrations, and implementing the compensation plan. Most of these measures were adopted that summer, and Operation Fish Run and the flip lips became permanent features of the Division's conservation program.⁵⁶

The final assessment of the 1974 migration showed the count of spring chinook the second lowest and steelhead the lowest on record. McConnell predicted that despite anything that could be done, for the next two years the Snake runs would be dismal. Moreover, it would be years until the compensation plan would increase fish populations. The public and Congress demanded that the Corps immediately implement emergency programs, blaming Corps dams for the problem. The Division believed the causes of the declining runs were more complicated. "Whether the dams are responsible for all of the fish problems is a speculative matter," McConnell explained to the Chief. "However, due to the high visibility of our dams . . . and an increasing amount of research information linking dams and their operations to juvenile and adult fish mortality, the Corps is catching the major blame."⁵⁷

In 1975, the compensation plan and a revised environmental impact statement recommended eight hatcheries, two each in Washington and Oregon and four in Idaho; 750 acres for fishery access and development; and 23,400 acres for wildlife habitat. Estimates of initial total costs were \$42,250,000 for fish, \$2,377,000 for wildlife lands, and another \$1,159,000 to purchase gamebirds. In addition to this total of \$45,788,000, annual operating and maintenance expenses were estimated at \$2,950,000 for the fishery facilities and \$1,000 for wildlife. Under the plan, the Division would bear the costs of constructing and developing the hatcheries and wildlife habitat areas, and the U.S. Fish and Wildlife Service would pay for operating and maintaining the hatcheries. States would assume the costs of wildlife habitat maintenance.⁵⁸

Although the federal and state fish and wildlife agencies accepted the report to which they had contributed, not all were enthusiastic. The Washington Game Department, a participant in the steelheader's suit, commented that the report lacked accurate data, especially on the pre-dam condition of fish and wildlife. After considering funding limitations and other constraints, the Department accepted the proposals as somewhat reasonable under the circumstances. The Oregon Fish Commission contended the plan was meant to reduce future losses and not increase numbers to previous levels. It concluded that further delay of compensation could seriously reduce the fish runs and fisheries. The 1975 environmental impact statement gave another perspective on the compensation plan. It noted the need for intensive manipulation of the natural systems disrupted by construction of the four dams, and it warned that establishing hatcheries and wildlife habitat areas would require long-term commitments of energy, manpower and money.⁵⁹

The long-term commitment was evident in both the fish and wildlife components of the plan. In order to preserve fish species compatible with specific environments, eight smaller hatcheries were substituted for the four larger ones. It later became necessary to change the location of the eight sites. In acquiring wildlife habitat, the Washington Game Department agreed to do the actual purchasing on a willing-seller basis. The Division also promised to reimburse the State Game Department for the land and development expenses, but the state would assume the annual operation and maintenance costs. The Division also would pay for access land and for stocking areas with game birds.⁶⁰

Congress finally authorized the compensation plan in 1976, but stipulated that no funds could be released until fiscal year 1978. In the meantime, the Division and fishery agencies began designing the hatcheries, testing water quality, and acquiring land, giving first priority to preserving summer chinook. The question of how to acquire the land remained unsettled. Although General Clarke had questioned General Kelley's recommendation that only a willing-seller approach be followed, strong opposition from the public, Idaho, Oregon and Washington governors, and some agency officials convinced Clarke to drop condemnation as an alternative method. The new Chief of Engineers, General John Morris, remarked during a 1976 trip to Walla Walla that although the Corps' policy was to purchase from willing-sellers, "if no one wants to sell, then I'm left with a problem that I can't resolve." When the Corps subsequently altered the plan to include condemnation if necessary, renewed complaints forced the Chief's Office to retreat to the willing-seller concept. By 1980 the Walla Walla District had decided not to consider additional access for fishermen or hunters, and the Chief's Office hoped additional lands would not have to be acquired. However, the Office advised the Division that if landowners were not willing to sell, the Division should not rule out the established land acquisition procedures.⁶¹

During the late 1970s the hatchery program also experienced delays, partly as a result of the steelheaders lawsuit. Although the court dismissed the case in 1977, the U.S. District Judge ordered Walla Walla District to file a supplemental proposal for enhancing fish and wildlife resources. This would mean returning the fish runs to a higher level than that which existed before the dams were constructed. The District filed its report in September 1978, and then prepared a plan of study. It recognized that before runs could be enhanced, they would have to be stabilized, that is

prevented from further declines. Here was the greatest difficulty. Costs for the hatcheries exceeded the budgeted amounts, and suitable sites still had not been found. Only the summer chinook hatchery at McCall in central Idaho appeared likely to be constructed by the end of the decade, and the District had just begun designing a steelhead facility in south central Washington at Lyons Ferry. It was also pursuing negotiations with the Hagerman National Fish Hatchery located in the southwestern part of Idaho for possible expansion into steelhead production. The District's proposal to expand the Dworshak hatchery below the dam on the Clearwater River in Idaho met with firm opposition from the Division Engineer who commented, "We have enough to do solving existing problems there without additional rearing requirements." The problem at Dworshak and elsewhere was finding an adequate supply of unpolluted water. A reliable source of pure water within a specific temperature range is the most important consideration for hatchery operations.⁶²

By 1980 the Division faced increasing costs for the hatchery program and lack of funds. Worried that Congress might not understand why more funds were necessary, General Wells requested Walla Walla District to prepare a full report. The report explained that original estimates were based on inadequate information from fishery agencies, only one of the recommended sites had been found suitable, and the actual water requirements had increased total costs to \$5 million. In fact, Walla Walla District estimated that the total water supply necessary for the eight hatchery system would be sufficient to supply a city of two million people.⁶³

The 1970s ended with another unresolved problem affecting the future of fish and wildlife compensation: Who would pay to maintain the facilities once the Corps had developed them? The court decision in the steelheaders trial requesting enhancement and not mere compensation of fish and wildlife compounded the problem. According to General Wells, the fish and wildlife agencies believed the Corps of Engineers had the authority to undertake an infinite variety of enhancement measures throughout the entire Columbia River Basin. However, the Fish and Wildlife Coordination Act could be interpreted as requiring only modifications of the basic water project structures, land and operations. The Division's adoption of a more liberal interpretation of enhancement and the expectations of fish and wildlife agencies raised the question of who would pay and how to apportion costs on a cost-sharing basis. Wells reported to the Chief's Office that these agencies believed they would not be involved with cost sharing in any proposed enhancement program. The Division understood that its funding would be limited to 75 percent of initial costs and that operations and maintenance would either be borne by non-federal agencies or shared with the Fish and Wildlife Service or the National Marine Fisheries Service.⁶⁴

General Wells, whose strong support of fish and wildlife marked his tenure at the North Pacific Division, considered financial and administrative responsibility for these resources an overriding concern. In a letter to the Chief, he charged that although the Division had made a determined effort to be responsive to federal laws and a good steward of the lands it owned, it was constrained from undertaking positive programs

by conflicting and outdated policies, ultraconservative administrative positions, and lack of adequate funding commitment. Wells suggested that federal lands already owned by the Corps, the Forest Service, and the Bureau of Land Management be used more extensively for mitigation, and that private lands be acquired only for extremely critical wildlife situations. In order to clarify the situation, he recommended that the Chief's Office issue a revised policy statement clearly emphasizing that the Corps was responsible for funding wildlife mitigation associated with its projects. Within the Division, new division and district engineers at the outset of their tours would be instructed regarding their obligations in this area and the expectations for a positive, progressive response.

Wells warned that without adequate operating and maintenance funds, acquiring land for mitigation would be meaningless. He emphasized that one of the greatest problems the Corps had was its long-standing, weak and unsupportable policy on operations and maintenance funding of these efforts. In Wells' view, the Corps accepted responsibility for operation and maintenance when the states and other federal agencies were usually unable to fund the programs. Even when they could grant funds, the money was usually inadequate. Wells stressed that despite this situation, the Corps should not divest itself of the responsibilities for mitigation. "These agencies," he explained, "just do not have the funding base to handle mitigation efforts for the Corps' national water projects program." And because the projects did create an adverse impact, he believed it was realistic that the Corps should fund all aspects.

Wells perceived that land leased to wildlife agencies and the resource management program were other weaknesses in the Corps mitigation efforts. He charged that the two programs lacked real substance, were primarily rhetorical and cosmetic, and were met with indifference from wildlife agencies and the public. States were contemplating returning lands to the Corps because of their own lack of funds, but the Division also lacked money and manpower to properly carry out the resource management program. Policy changes within the Corps, Wells advised, were necessary to bring about a dynamic and progressive approach to wildlife development. The policy should emphasize the Corps' long-range goal of optimizing wildlife habitat and populations for aesthetic and ecological reasons and for the public's benefit. It should declare the Corps' intention to fund and staff its field organizations, giving them a leadership role and granting the Division Engineer the authority to license and manage lands according to local needs, shared costs and manpower. The Division should above all retain its leadership position in this area. Its financial commitment need not be large, Wells observed, but funds should be relatively stable and available on a continuing long-range basis. The Division would need the Chief's support of budgetary requests or it should have the ability to establish a special account for funding wildlife mitigation. Wells believed that by undertaking these measures, the Division would demonstrate that construction and operation of reservoir projects did not necessarily have to result in drastic reductions of wildlife habitat and populations.⁶⁵

CHAPTER 13. ENDNOTES

1. Schley to Bone, 9 Dec. 1940, RG 77, Seattle FARC, NPD 524/26.4, "Pollution of Waters, 1935-1940."
2. Oregon State Planning Board, *Oregon Looks Ahead*, p. 63; Minutes, Annual Meeting of the Columbia Valley Association, Portland, 21 Nov. 1953, RG 77, Seattle FARC, NPD 503/70.3, Vol. 4, "General, 1931-1940."
3. *Water Resources Development by the U.S. Army Corps of Engineers in Oregon* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1979), p. 4. For an example of a later interagency study on the Willamette Basin see Pacific Northwest River Basin Commission, *Willamette Basin Comprehensive Study: Water and Related Land Resources*, 1969.
4. Col. Lee, Division Engineer to Portland District Engineer, 23 Oct. 1939, RG 77, Seattle FARC, NPD 503/121.6, Vol. 2, "General, 1931-1940."
5. Petersen, "The Army Corps of Engineers and the Environment in the Pacific Northwest", pp. 89-90.
6. *Ibid*, p. 96.
7. Kelley to Clarke, 2 Feb. and 6 May 1971, NPD Quarterly Reports.
8. Marshall to Clarke, 5 Aug. 1971; Sawyer to Clarke, 10 Nov. 1971, *ibid*.
9. Sawyer to Clarke, 10 Nov. 1971 and 13 Oct. 1972, *ibid*.
10. Jameson, Petersen and Reed, *Walla Walla District History*, Vol. 3, p. 93.
11. Willingham, *History of the Portland District*, p. 213; Kelley to Clarke, 6 May 1971, NPD Quarterly Reports.
12. *Ibid*; Marshall to Clarke, 5 Aug. 1971; Sawyer to Clarke, 10 Nov. 1971, *ibid*.
13. Sawyer to Clarke, 13 Oct. 1972, *ibid*.
14. The case study of Grays Harbor is taken from Petersen, pp. 77-119. The sources used are, *Grays Harbor Widening and Deepening Revised Draft Environmental Impact Statement* (Washington, D.C.: Office of the Chief of Engineers, 1976), pp. 10-11; *Dredged Materials: A Potential Resource* Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station, n.d.); *Public Meeting on Grays Harbor, Chehalis River and Hoquiam River, Washington, Navigation Channel Improvements*, 22 May 1975 (Seattle: U.S. Army Corps of Engineers, Seattle District); *Public Meeting on Channel Improvements, Grays Harbor, Washington* (Seattle, U.S. Army Corps of Engineers, Seattle District, 1976), pp. 43, 53. For information on using dredged material, see Gen. W. O. Bachus, "Beneficial Uses for Dredged Material," *Military Engineer*, 67:436 (March-April 1975), pp. 72-73.
15. Fred C. Weinmann and John Malek, "Planning for Maintenance Dredging in Grays Harbor Estuary," Manuscript presented to the American Society of Civil Engineers Publications Services, 30 Dec. 1977, Seattle Planning Branch Files, "Grays Harbor," *Long-Range Maintenance Dredging Program. Final EIS Supplement No. 2* (Seattle: U.S. Army Corps of Engineers, Seattle District, 1980), p.i; *Grays Harbor Widening and Deepening Revised Draft EIS*, pp. A1-A2; Gov. Evans to District Engineer Col. W. O. Bachus, 22 June 1973, Seattle Planning Branch Files 1973. These sources are from Petersen, pp. 98-99.
16. For correspondence from various resource agencies demanding environmental studies, see Seattle Planning Branch Files, "Grays Harbor," *Environmental Statement, Grays Harbor and Navigation Project, Washington* (Seattle: U.S. Army Corps of Engineers, Seattle District, 1970); *Final EIS Long-Range Maintenance Dredging Program*, pp. D8-D9; *Draft, Fish and Wildlife Coordination Act Report, U.S. Army Corps of Engineers, Grays Harbor and Chehalis River Improvements to Navigation Project* (Olympia: U.S. Fish and Wildlife Service, 1981), pp. 48-63. The quotation is from the 1976 *Public Meeting*, p. 64. Sources from Petersen, pp. 101-08.
17. Briefing presentation for Gen. Richard H. Groves, 11 Oct. 1969 by Mains, NPD, RHA, Executive Office Files, "Fish Passage."
18. Kelley to Clarke, 5 Nov. 1970, NPD Quarterly Reports. The two regulations were ER 1120-2-401 and 1120-2-404. Kelley maintained that the regulations excluded other commercial fish and wildlife enhancement but rather arbitrarily required cost-sharing for commercial anadromous fish. He pointed out that the Anadromous Fish Act (PL 84-304) specifically excluded the Columbia River drainage.
19. Sawyer to Montana Senator Lee Metcalf, 31 May 1972, NPD, RHA, Civil Works Project Files, "Miscellaneous."
20. Yales to Cassidy, 1 Aug. 1968, NPD Quarterly Reports. Walla Walla District Engineer Col. Giesen reiterated this same charge in a letter to Thomas Kimball, Executive Director of the National Wildlife Federation on 9 April 1970. In protesting the anti-Corps article in *National Wildlife*, Geisen stated that the obvious purpose was to prevent authorization of the Ben Franklin project. See, Walla Walla District, PAO, IHF, "Fish and Wildlife, 1970."
21. Ed Chaney, "Too Much for the Columbia," *National Wildlife*, April-May 1970; Kelley to Fish and Game Agencies and Congressional Delegations, 28 Oct. 1970, Walla Walla District, RHA, PAO, IHF, "Fish and Wildlife, 1970."

22. Kelley to Clarke, 2 Feb. 1970, NPD Quarterly Reports.
23. Giesen to Division Engineer, 29 June 1970, NPD Quarterly Reports; Biggs to Maj. Matthias, 9 June 1970, Walla Walla District, RHA, PAO, IHF, "Fish and Wildlife, 1970."
24. Memorandum, W. M. Zink, NPD Executive Assistant to Walla Walla District Engineer, 24 June 1970, *ibid*; statement on Dworshak Dam was made by Matthias and quoted in the *Oregonian*, 1 July 1970. Information on lawsuits in Kelley to Clarke, 3 Aug. 1970, NPD Quarterly Reports.
25. Col. John M. Ansley, Deputy Division Engineer to Portland, Seattle and Walla Walla District Engineers, 24 Sept. 1970, Walla Walla District, RHA, PAO, IHF, "Fish and Wildlife, 1970."
26. Kelley to Fishery Agencies and Congressional Delegations, 28 Oct. 1970, *ibid*.
27. Kelley to Clarke, 2 Feb. and 6 May 1971, NPD Quarterly Reports; Edward N. Sanchez, "The Holey Gates," *Military Engineer*, 64:417 (Jan. - Feb. 1972), pp. 5-7; Kelley to Clarke, 5 Aug. 1971, NPD Quarterly Reports.
28. Sawyer to Clarke, 10 Nov. 1971 and 14 Feb. 1972, NPD Quarterly Reports.
29. Darwin K. Anderson, NPD Counsel to Ed Sanchez, NPD Public Affairs Office and Gordon Fernald, 7 Feb. 1972; Raymond P. Underwood, Oregon Department of Justice to Col. Charles Brinkley, Deputy District Engineer, Portland, 25 Feb. 1972; Day "Notice of Intended Action Regarding Proposed Amendment to Water Quality Standards," 20 Jan. 1972; Sawyer to Marshall, Darwin Anderson and Fernald to Marshall, 8 March 1972, all in NPD, RHA, Office of Counsel, "Navigable Waterways, N₂ Waste Discharge Permits."
30. Cox to Division Engineer, 28 March 1972, *ibid*.
31. NPD Circular No. 340-2.2, 4 May 1972, *ibid*; Oregon Journal, 18 May 1972.
32. Sawyer to Clarke, 10 May 1972, NPD Quarterly Reports.
33. Col. Thomas W. Nelson, Assistant Director of Civil Works, Chief's Office to Senator Packwood, 22 June 1972, NPD, RHA, Civil Works Project Files, "Nitrogen Supersaturation Program"; Sawyer to Clarke, 10 May 1972, NPD Quarterly Reports.
34. Sawyer to Clarke, 15 Aug. and 13 Oct. 1972, NPD Quarterly Reports.
35. Preston, *Walla Walla District History*, Vol. 2, pp. 64-65; Robert Baunach, NPD Engineering Division to Walla Walla District Engineer, 20 Oct. and 14 Nov. 1972, 14 Aug. 1973, NPD, RHA, Civil Works Project Files, "Nitrogen Supersaturation Program." Another useful description of NPD's research efforts and programs especially with reference to the Bonneville second power house is in memorandum to Chief's Office, 16 June 1972, "Tentative Program for Reduction of Nitrogen Supersaturation, North Pacific Division, Fiscal Year 1973 through 1977," *ibid*.
36. Preston, *Walla Walla District History*, Vol. 2, pp. 64-65; Jameson, Petersen and Reed, *Walla Walla District History*, Vol. 3, pp. 83-84; Frank King, "Operation Fish Run," *Water Spectrum*, 9:4 (Fall 1977), pp. 7-11. For information on the transport program in relation to the fish kill of spring 1972, see Col. Nelson to Sen. Packwood, 22 June 1972, NPD, RHA, Civil Works Project Files, "Nitrogen Supersaturation Program." Information on the 1980 program is in letter of Division Engineer Gen. Wells to Chief of Engineers Gen. Bratton, 21 Oct. 1980, NPD Quarterly Reports.
37. Donn L. Park, "Transportation of chinook salmon and steelhead smolts, 1968-80, and its impact on adult returns to the Snake River," Oct. 1980, prepared for the National Oceanic and Atmospheric Administration, Seattle, Washington.
38. Lewiston *Tribune*, 16 June 1976.
39. Ed Chaney and L. Edward Perry, *Columbia Basin Salmon and Steelhead Analysis* (Pacific Northwest Regional Commission, 1976), p. 27.
40. Minutes of Coordination Meeting of the Pacific Northwest Fish and Wildlife Agencies and the Corps of Engineers, Portland, 24 May and 26 June 1974, NPD, RHA, Civil Works Project Files, "Hydropower."
41. *Lower Snake River Fish and Wildlife Compensation Plan, Special Reports* (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, June 1975), p. 35.
42. Memorandum, Col. Giesen, Walla Walla District Engineer, 16 May 1960; Ken Wise, Chairman of Steelhead Study group to Giesen, 15 May 1960; and, Minutes of May 7 Study Group, in Walla Walla District, RHA, PAO, IHF, "Steelhead Experiment 1969"; Giesen to Rep. James A. McClure, 8 May 1970, *ibid*, "Fish and Wildlife, 1970."
43. Position paper on the effect of Snake River dams on fishing and other water resource activities, 13 May 1970, Walla Walla District, PAO, IHF, "Lewiston Problems, 1970"; Kelley to Giesen, 28 Aug. 1969, *ibid*.
44. Robert H. Jordan, Special Assistant to Secretary of Army to Sen. Allen J. Ellender, Chairman, Subcommittee on Public Works, Committee on Appropriations, 11 May 1970, Walla Walla District, RHA, Counsel 410-01, Litigation Case File, "Steelheaders vs. U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service." Plaintiffs also included the Spokane County Sportsmen's Association, Hells Canyon Preservation Council, Western Washington Council of Fly Fishing Clubs, Green River Steel-

head-Trout Club, Renton Fish and Game Club, Cowlitz Sportswomen's Association and the Snohomish County Sportsmen's Association.

45. Seattle *Argus*, 18 Nov. 1970; Jordon to Ellender, 11 May 1970, Walla Walla District, RHA, Counsel 410-01 Litigation Case File, "Steelheaders vs. U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service"; Kelley to Clarke, 8 May 1970, NPD Quarterly Reports.
46. Kelley to Clarke, 3 Aug. 1970, *ibid*; H. Calvert Anderson, IEWA Executive Vice-President to Evans, 9 July 1970, Walla Walla District, RHA, PAO, IHF, "Lewiston Problems, 1970"; Lewiston *Tribune*, 9 Aug. 1970. The IEWS filed a petition seeking Friend of the Court status to help the Corps present its case. See Kelley to Clarke, 2 Feb. 1971, NPD Quarterly Reports.
47. Record of telephone conversation of 18 Sept. 1970 between Ray Oligher of Walla Walla District and Jack Hemphill; Kelley to Findlay, 8 Sept. 1970, Walla Walla District, RHA, Counsel 410-01, Litigation Case File, "Steelheaders vs. U.S. Army Corps of Engineers."
48. *Spokesman-Review*, 30 April 1971.
49. Sawyer to Clarke, 10 Nov. 1971, NPD Quarterly Report; *Spokesman-Review*, 17 Dec. 1971; Jameson Petersen and Reed, *Walla Walla District History*, Vol. 3, pp. 87-88.
50. Seattle *Argus*, 23 Oct. 1970; *Record of Public Meetings, Special Lower Snake Report* (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, 1973), pp. I-4 to I-11. Hereafter cited as *Lower Snake River Public Meetings*.
51. *Ibid*, pp. II-16 to II-19.
52. *Ibid*, pp. V-138 to V-139.
53. Seattle *Post-Intelligencer*, 18 March 1960. For background on the case, see file "Snake River John" in Walla Walla District, RHA, PAO, IHF.
54. *Lower Snake River Public Meetings*, III-30, IV-19, IV-37.
55. *Ibid*, IV-53.
56. McConnell to Gribble, 31 July 1974 NPD Quarterly Reports; Fred Cleaver, National Marine Fisheries Service to Col. Nelson Conover, Walla Walla District Engineer, 5 Nov. 1974, NPD, Program Development Files, "Lower Snake River, Fish and Wildlife Compensation Plan."
57. McConnell to Gribble, *ibid*.
58. Walla Walla District, *Lower Snake River Fish and Wildlife Compensation Plan, Revised Draft Environmental Impact Statement* (Washington, D.C.: U.S. Army Corps of Engineers, Office of the Chief, June 1975), p. 1-11. Hereafter cited as *Lower Snake River Revised EIS*.
59. Crouse to Findlay, 22 March 1972, in *Lower Snake River Fish and Wildlife Compensation Plan* (Walla Walla: U.S. Army Corps of Engineers, Walla Walla District, 1975), appendix. Hereafter cited as *Lower Snake River Plan*; "Report of Fish Commissioner of Oregon as supplement to report of National Marine Fisheries Service and Bureau of Sport Fisheries and Wildlife, Sept. 1972," 7 March 1973, *ibid*; *Lower Snake River Revised EIS*, p. 7-3.
60. Jameson, Petersen and Reed, *Walla Walla District History*, Vol. 3, pp. 95-96; *Lower Snake River Plan*, pp. 93-95.
61. Mains, NPD Chief of Environment Resources Branch, 1 Dec. 1976; Jack Donaldson, Oregon Department of Fish and Wildlife to Federal and State Fishery Agencies, 6 Dec. 1976, NPD, Program Development Files, "Lower Snake River Fish and Wildlife Enhancement"; Walla Walla *Union-Bulletin*, 27 Aug. 1976; Jameson, Petersen and Reed, *Walla Walla District History*, Vol 3, pp. 98-99; Heibert to Division Engineer, 15 Jan. 1980, NPD Program Development File, "Lower Snake River Fish and Wildlife Compensation Plan"; Allaire to Reed, 3 Oct. 1977, NPD Quarterly Reports.
62. Jameson, Petersen and Reed, *Walla Walla District History*, Vol 3, pp. 85-86; Charles McGinnis, Director of Civil Works, Chief's Office, 30 Nov. 1978, NPD Programs Development Files, "Lower Snake River Fish and Wildlife Compensation Plan"; Phillip L. Cole, Chief, NPD Engineering Division to Walla Walla District Engineer, 24 Nov. 1978, *ibid*; Allaire to Peel, 3 Oct. 1978, NPD Quarterly Reports.
63. "Minutes of 5 Dec. 1969 meeting between Walla Walla District and NPD on funding for Lower Snake Comprehensive Plan and Dworshak Fish Hatchery," 10 Jan. 1980, NPD Program Development Files, "Lower Snake River Fish and Wildlife Compensation Plan"; Col. Henry J. Thayer, Walla Walla District Engineer to Division Engineer, 18 Jan. 1980, *ibid*.
64. Wells to Chief's Office, 15 Jan. 1980, NPD, RHA, Administration Services Files, 1501-02 Engineering Administration, "Fish and Wildlife." At that time President Carter had proposed that states contribute five percent minimum to enhancement costs. See letter of Gen. Heiberg to Wells, 11 March 1980, *ibid*.
65. Wells to Heiberg, 2 Jan. 1980, *ibid*.

XIV

SURVEYING ALASKA'S RESOURCES, 1869–1955



It is quite evident that the over-all defense of Alaska depends upon two closely interrelated factors, the military facilities and installations available to the Armed Forces and the civil resources of the Territory. To the extent that civil facilities are developed to a level which will permit a self-sustaining economy and a full development of the natural resources of the Territory, the expenditures for purely military works may be reduced.

Lt. General Nathan F. Twining
Alaska Command, Fort Richardson
November 19, 1948



Shipping at north revetment of Nome harbor, 1933.

1. Introduction

Although Alaska is part of the North Pacific Division, it forms a geographically separate district, a logical situation in terms of its location, population and commercial growth. As the last northwestern region to be developed, Alaska does not fit readily into the general patterns of navigation, hydropower and flood control projects of the Pacific Northwest states. Because of its strategic importance, military construction over-shadowed the civil works program into the 1960s. The dominance of military projects was understandable in terms of the small population. Consequently water resources planning occurred later, and the first "308" reports for Alaska were authorized in 1948 and completed in the 1950s as compared to the early 1930s in the Columbia Basin states. Furthermore, the undertaking of water projects was hampered by an elaborately indented and forbidding coastline in the southeast; lack of good, all-weather and all-season harbors; rivers that were either shallow and meandering or torrents that discouraged navigation; and the slow growth of power markets and population to justify expensive projects.

At first, the Corps' presence in Alaska was slight. After an expedition in 1869, Army Engineers served on interagency road commissions, and the Seattle Office supervised navigation improvements in the southeast and southcentral areas where fishing and logging predominated and at Nome, the scene of the 1899 gold rush. The Corps itself did not perceive Alaska as part of the regular divisional system, and it established a Juneau Engineer District in 1921 which was separate from the North Pacific Division. The Engineer Officer at Juneau was in charge of civil works and served on the Alaska Road Commission. In 1932 the Corps transferred civil works to the Seattle Office. In 1939, after conducting several projects as part of the public works legislation, the Seattle District established an Area Office at Anchorage. Captain Benjamin B. Talley assumed the duties of Area Engineer, overseeing military construction for the District in 1941. With the accelerated pace of military construction during World War II, the Alaska Defense Command, later known as the Alaskan Department, controlled all military construction with the District retaining control of civil works. The need for more sophisticated military installations and support at the end of the war resulted in the formation of the Alaska District as part of the North Pacific Division. The new district still suffered a separation of its duties as the Seattle District, on the advice of the Division, retained control of civil works projects. This decision was based on the difficulty of recruiting and retaining personnel at the Anchorage office where staff and their families occupied temporary tarpaper-covered buildings.

The Alaska District concentrated on defense and strategic projects in the 1950s and 1960s, beginning with installations for defense of air and naval bases. It then undertook construction of advanced warning, communications, and interception systems for the Army and Air Force. The completion of these military projects (from a peak of \$160 million in 1952 to less than \$40 million in 1967) brought about a reevaluation of the Corps' role in Alaska and a more even balance between military and civil works projects. The District began investigating several large flood control and hydropower projects as well as undertaking numerous smaller, but extremely important navigation and harbor improvements. In the studies of hydroelectric projects at Snettisham, Rampart and Suisitna, the District encountered the problems and issues surrounding all water resource proposals in the 1960s and



Captain Charles P. Ramond. He headed the first official federal survey of the Alaska interior in 1869.

1970s. Like other districts in the North Pacific Division, Alaska District responded to challenges from environmental groups, native groups, and various anti-dam interests who succeeded in delaying or shelving the larger projects. Alaska was unique, however, because of oil discoveries and sweeping proposals to construct a trans-state pipeline with the attendant problems of land ownership, environmental concerns, and the harsh climate. As the agency that issued permits for the pipeline through wetlands, the Corps became a key principal in this endeavor. Oil eclipsed all other natural resources in a state that had lured adventurers and entrepreneurs to the far northwest since the days of the Russian seal hunters. But it was gold that first attracted Americans to Alaska, either as gold rushers with hastily packed bags or avid consumers of popular writings about this exotic region. The influx of people into the gold fields and trading centers made the Federal Government aware of the difficulties of reaching and penetrating a territory that promised a bounty of wealth.

2. Early Engineering Works in Alaska

In 1869 Captain Charles P. Raymond of the Corps of Engineers headed the first official federal survey of the Alaskan interior just two years after the territory was purchased from Russia. His explicit assignment was to determine the longitude and latitude of Fort Yukon, still occupied by the Hudson Bay Company, but assumed to be on United States territory. Wishing to take full advantage of the mission, Congress requested additional information on the amount of trade conducted by the fur company, the resources of the Yukon River and its tributaries, the number and disposition of the native Alaskans, and the number and condition of public buildings at Michaelovski, or St. Michael, near the mouth of the Yukon.¹

After reaching Fort Yukon in July, Raymond was frustrated by the twilight that lasted all night. He was finally able to make one observation of its geographical position during a solar eclipse. This established the longitude that proved the fort was on American territory. Employing his authority as a temporary agent of the Treasury Department, the Captain took possession of the property in a brief ceremony. Then learning that his escort of fur traders had departed earlier than expected, Raymond and his two assistants began the long, hazardous journey back to St. Michael's. The party's transport was a hastily constructed skiff of sawn timber calked with rags and thickly covered with pitch. Suffering tremendously from cold, exposure and hunger, they foundered over hummocks and deep moss of swamps through a country Raymond described as "under any circumstances except those of actual necessity might well be called impassable."²

Besides the valuable map of the Yukon River, Raymond's report contained useful observations on the features and resources of the country, the Native Alaskans, and possibilities of the fur trade. While acknowledging that his information was too uncertain and limited to justify conclusions, Raymond suggested that the profitable management of the trade would require establishing and maintaining permanent river stations. The Yukon, with its swift current and shoals, was difficult for even a small boat to navigate, and the shallow water at its mouth barred ocean vessels, making it impossible to conduct even a simple trade from decks of sloops and schooners. He further noted that stands of timber and abundant runs of fish could not compete with resources more accessible to markets, and agriculture could only be "an auxiliary or incidental occupation of persons principally engaged in other pursuits."³

The circumstances surrounding Raymond's expedition raised the question of Alaska's importance in the national scheme. In 1884 U. S. Treasury Agent George Wardman complained that "Alaska is really of little value to our government beyond what is derived from the seal islands, rent, and tax, and the vague benefits from the fur trade in general." He did suggest that at least the coast might be surveyed in the interests of navigation.⁴

The discovery of gold in the Klondike in 1894 banished previous doubts and changed the nation's attitude toward Alaska. The icebox was now a potential treasury of mineral riches and a source of adventure. After the Klondike strike, other miners discovered gold in the beaches around Nome which were infinitely easier to reach and work. Later prospectors located mines at Fairbanks, and mining activity continued sporadically through the mid-1900s.

The effect of the gold rushers on the Alaskan economy was only temporary with many boom towns disappearing as quickly as they had risen. The rapid population increase momentarily created a vigorous local economy. The population of the Seward Peninsula during the Nome gold mining era rose to 12,488 with some estimates reaching as high as 40,000. By 1910, the population had declined to 2,061, and by 1929 it had increased by only a few hundred. It was apparent that one of the most serious problems hindering Alaska's development was a lack of good roads and ports.⁵

Before World War II and completion of the U. S.-Canadian Highway to Alaska, the territory depended on water transportation for the bulk of its supplies, with goods transhipped to the interior. In the early 20th century, the lack of exportable goods from Alaska meant that ships without



Alaska vicinity map.

return cargoes had to charge high freight rates to make a profit. The great distances between the Pacific Ocean ports of the continental United States and Alaska further discouraged shipping to the two major ports, Skagway on the southern coast and St. Michael in northwestern Alaska. Rail heads at Puget Sound ports were over 600 miles by sea from the southernmost Alaska boundary and 1,800 miles from St. Michael. The inland passage, though protected from the Pacific Ocean, was an elaborate pattern of islands, inlets and channels. The Alaska District's 1950 report on the Copper River and Gulf Coast describes the topography of the coastal region as being so rugged "that it not only precludes the possibility of land routes along the coast but provides only a very limited number of access routes into the hinterland."⁶

In Alaska's interior, the complex drainage system with its interlocking tributaries flowing in different directions baffled explorers and prospectors. The Yukon River, the main highway and navigable for its entire length, is fed by tributaries flowing from many directions. The only rivers flowing from the interior through the southern coastal mountains, the Copper and Alsek, cannot be navigated. Then there are the mountains. The Alaskan Mountain Range curving along the south central coast and the Brooks Range, extending from Canada to the Bering Sea guard the interior like "great concentric walls of a medieval fort." Beyond the topographical complexities is the immensity of the region which impressed the great explorer A. H. Brooks who wrote in 1925, "the dimensions of the territory are of continental magnitude. This basal fact must be clearly comprehended by him who would understand the country."⁷

Improving shipping and developing interior transportation routes bore the strong imprint of the Federal Government with the Corps as a major contributing agency. The engineers' first



A steamer in 1887 in Peril Straits, part of the Alaskan Inland Passage.

activities in Alaska focused on aiding trade and permanent occupation. In addition to Raymond's expedition, the Corps investigated Portland Canal, a natural waterway which forms part of the southern boundary between British Columbia and Alaska. The 1896 survey under Captain D. D. Gaillard, on assignment from Washington, D.C., included the construction of four stone storehouses on the western bank. In this year before the Klondike gold rush, Gaillard noted that the only United States steamers using the canal were those conducting surveys, and that no permanent white inhabitants could be found along the canal. It was, however, full of fish. The Captain estimated the salmon run as between five to six thousand fish in a half mile of stream. He was impressed with the pleasant image of a region where a man could secure a year's supply of meat in less than three hours with no risk or uncertainty, and but little exertion.⁸

In the early 1900s the Corps began improvements on two major shipping channels: the Wrangell Narrows, a 21-mile channel in the Inland Passage; and St. Michael Canal, a 17-mile slough between the mouth of the Yukon River and the harbor at St. Michael Island. The survey of the Wrangell Narrows in 1903 under the Seattle District, was the Corps' first civil works assignment in Alaska. The Seattle District conducted several other surveys until the creation of the Juneau Engineer District in 1921. During the years it was authorized (1921-1934), the Juneau District completed 30 examinations and surveys and began or continued five projects.⁹

In 1903 Division Engineer Colonel Heuer emphatically denounced the Wrangell channel as a menace to life and property, although it was a year-round passage for small vessels and a growing amount of trade. In 1902 this commerce included 40 tons of gold dust valued at almost \$16 million and 1,690 tons of salmon valued at \$139,200. The enlargement and deepening of the Narrows would permit larger vessels to stay within the shelter of the islands and avoid the dangerous 90-mile detour into the Gulf of Alaska. In his 1903 survey, Major John Millis noted that commercial considerations aside,

the improvement would have a bearing on the coast defense system.¹⁰

Improvement of the St. Michael Canal, described as a narrow and tortuous saltwater channel between St. Michael Harbor (the only port available for the Yukon River trade) and a point 38 miles northeast of the mouth of the Yukon River, would offer a safe passage for Yukon river boats and barges to pick up cargoes from ocean vessels. Freighters could not enter the shallow mouth of the Yukon. Instead, river boats had to risk 15 miles of open sea to the harbor, often waiting a week at the river's mouth to attempt the passage. Traders and passengers could choose an alternative route through the interior by narrow-gauge railway over White Pass to Dawson in Canada's Yukon Territory and then by water to settlements on the Yukon River. Although this route was safer and more attractive to most passengers, freight rates on the water route to St. Michael were considerably less and the route did not cross Canadian territory.¹¹

Congress delayed the Wrangell Narrows project until the mid-1920s, finally completing it in 1928 with subsequent improvements in 1934. St. Michael received prompt attention in 1905 when the Corps began widening and deepening the slough. Lieutenant George Pillsbury, Chief Engineer of the newly created Alaska Road Commission, directed the work from his station at Skagway, 2,800 miles from the project. His work was considerably complicated by the distance of 2,500 miles between the supply point at Seattle and the canal, the short working season, and the high costs of labor and freight. By 1911 the project was completed, and during the next two seasons a dredge deepened the mouth of the Yukon River.¹²

The third major navigation project carried out between 1917 and 1923 was at Nome, 150 miles from Siberia and at that time the most northerly port with regularly scheduled freight and passenger service. Its position as a trade center and a gold mining district offset severe navigational difficulties. All cargo and passengers had to be carried by lighters through the heavy surf to the unprotected beach with consequential loss of life and property. Although a 1915 survey found the costs of improving the harbor prohibitive, the Corps proposed

Loading passengers for the Steamer *St. Paul* in Nome, around 1903.



construction of two jetties at the mouth of the Snake River which empties into Nome Harbor. The costs of the project, \$272,950 for two jetties plus an annual amount of \$25,000, were justified by Nome's position in the 1930s as an outpost of American trade and influence with regard to Asiatic Russia.¹³

Concern over navigation safety played a secondary role to federal interest in developing interior routes. In the early 1900s Alaska had no road or rail connection with the United States, and the roads that did exist crossed into Canadian territory. There were less than 12 miles of wagon roads and only a few hundred miles of pioneer trails. The water routes between Alaskan ports were circuitous and indirect, and the quickest route between Juneau and Nome was via Seattle.¹ Because of the lack of commerce to attract private capital, the Federal Government assumed responsibility for and costs of opening Alaska to settlement and trade. Developing Alaska's roads depended to a large extent on cooperation among federal agencies. In 1901 Congress appropriated \$100,000 for roads and trails, and in 1905 it authorized the successful, interagency Alaska Road Commission. The Commission included representatives from the regular Army and the Corps, and its board consisted of two Army officers stationed in Alaska. The Army constructed a wagon road from Valdez on the Alaskan coast to Eagle on the Yukon, and surveyed and located a military trail from the Yukon River north to Coldfoot above the Arctic Circle.¹⁵

The construction of these wagon roads tested the skills and perseverance of the engineers. As Seattle District Engineer Major John Millis observed in 1905, "every undertaking in the interior of Alaska is attended with difficulties and involves contingencies which it is not possible to accurately forecast." He detailed problems of high prices, illnesses among the crew, and delays in the spring thaw. Despite all setbacks, the Road Commission transformed the important route from Valdez to Fairbanks from a trail, to a road and then to a highway. Now known as the Richardson Highway, it had its first through automobile in 1913.¹⁶



A Corps of Engineer's tug bringing a scow into the improved channel, Nome Harbor.

The success of the Alaska Road Commission lay in its independence. Unlike other federal bureaus in Alaska that were closely administered from Washington, D.C., the Commission and its Board were permanently located in Alaska and had full authority to make independent decisions. When Congress reduced its appropriations during World War I, the road and trail system quickly deteriorated. In 1920 the government authorized \$10,000 and dispatched Major Gotwals and Colonel Steese of the Corps to Alaska to rehabilitate the Commission and prepare a ten-year program of work. Subsequently the Road Commission was given other responsibilities and developed a well-coordinated field organization. In 1923 the Commission and other agencies



The Alaska Highway under construction.

involved in engineering and construction work in the territory consolidated their functions, leading to a coordination of interests and facilities.¹⁷

The completion of the Alaska Railroad from Seward to Fairbanks in 1923 further relieved transportation problems in Alaska. The railroad helped open up coal fields in the interior and assist in the defense of the Pacific coast, although the strategic importance of the region was scarcely recognized at that time. Despite the high maintenance costs and lack of traffic on rail-roads and highways, the government had demonstrated its commitment to Alaska, but Alaska's development was still in the future. In fact, World War I had an adverse effect on the territory. Increased prices and wages made gold mining unprofitable, and the population declined because of higher wages paid in the United States and the enlistment of Alaskan men in the armed services.¹⁸

The early structure of engineer affairs in Alaska reflected the geographic distances and uncertainties of how to best administer this far northwestern region. The Corps' decision in 1921 to establish an engineering office at Juneau met with some resistance from the Seattle District Engineer and the Division Engineer. Seattle District had assisted the Alaska Road Commission with civil works in Alaska, and in 1909 the Corps authorized it to take charge of this work on the grounds that it could be more efficiently and economically handled from that office. The subsequent creation of an engineering office in Juneau cannot have been made with much attention to geography. Although the southeast coast was prominent in the fishing industry and shipping, it was isolated from the rest of Alaska by encircling mountains that to this day prevent overland communications with other parts of the state. Moreover, all material and supplies for river and harbor works in Alaska had to be obtained and shipped from Seattle, and Seattle was within easy reach of the south-eastern part where civil works were concentrated. The Juneau District proved to be short-lived, and in 1932 it was disbanded as a result of the economic depression and the sharp curtailment in civil works throughout the Division. Seattle District then resumed responsibility for this work.¹⁹

3. First Planning Efforts

River and harbor work in Alaska before World War II concentrated on the few southeastern and southcentral ports, the fishing trade, and Nome at the mouth of the Yukon. A comprehensive survey of Alaskan resources and transportation routes occurred in the late 1930s under the National Resource Planning Board and later with a survey along a proposed railroad route from St. George, British Columbia, to Fairbanks, and along the Yukon River to a harbor on the Bering Sea.

The Alaska Resources Advisory Committee was a consortium of planners, scholars, and officials from the Corps who prepared special staff reports. The Committee examined the problems of government, federal jurisdiction of resources, and law enforcement stemming from Alaska's territorial status. It investigated the development of the region through air, water and surface transportation and hydropower, and firmly put to rest the icebox concept: "The study of the Committee has led to the conclusion that there is no reason whatsoever to question the value of Alaska's contribution to the national economy . . . Already in Alaska fisheries and fur trapping have produced over a billion dollar's worth of products, and Alaska mines another three-quarters of a billion - all at a relatively small cost to the nation and with a handsome return on the original \$7,200,000 investment." The Committee explained that, nonetheless, the major problem remained the same as during the period of Russian occupation: transportation and communications to and from the territory and within it. Sensitive to Alaska's wildlife and scenic attractions, the Committee cautioned that water resource development should not be detrimental to these values. In viewing the development of water resources, the staff report emphasized the importance of the Federal Government. It stressed that surveys should not be left to the whim of individual initiative or private support, because the primary value was in their continuity, completeness, and availability.²⁰

The U.S. Geological Survey with the cooperation of the Forest Service investigated Alaskan water supplies from 1906 to 1921. In 1930 the Forest Service published available water

flow records from Southeastern Alaska. This was a primary location for surveys of water power sites because of interest in manufacturing wood pulp. By the late 1930s the Federal Power Commission had licensed nearly 50 power projects, ranging in size from 10 to 5,000 horsepower, and identified others that could be developed inexpensively. The capacity of these sites was small, but it was thought that the power from several could be concentrated at a single manufacturing center. Stream flow features were promising: heavy run-off and high water levels; good storage possibilities; accessibility to navigable waters; and, sites for industrial plants. The limiting factors were Alaska's lack of population centers and the great distances between power sites and potential markets in the United States. In view of these conditions, the report concluded that the most efficient use of hydropower would be in developing a newsprint industry in the southeast. In recommending further work, the Alaska committee suggested a general program for studying special factors affecting water supplies such as the ice-free periods of streams, hydraulic characteristics of permafrost, the regimen of streams originating from glaciers, and use of water for disposal of mining residues. In order to accomplish this, trained engineers, adequate staffs, laboratory facilities and equipment were needed.²¹

Defense planning brought about the next stage of investigations into Alaskan resources. Although Congress was reluctant to vote funds to fortify Alaska until the Japanese attack on Pearl Harbor in 1941, the National Resources Planning Board inquired about the location, size and supplies needed for proposed military installations. It also investigated the need and desirability of economic development of the territory that would advance local self-sufficiency and provide added security for the military. Roy Bessey, the Planning Board's Portland representative, believed that territorial and national security called for roads and improved navigation as well as broad development of key strategic regions where large populations would settle. He thought this would promote a strong symbiotic relationship between the military posts and communities as the new flow of wealth and payrolls to the territory would encourage industry, trade and services, but air transportation was the pressing concern.²²

The National Resources Board recommended inaugurating Pan American air freight and passenger service and constructing an international highway from Alaska through Canada to the continental United States. The highway project was undertaken for defense purposes, but its greater impact was to open Alaska to civilian traffic from the lower 48 states. The first proposal for a highway came from Donald MacDonald, a government engineer who envisioned linking Alaska with Panama. In 1933 Congress authorized Roosevelt to form a joint commission with Canada, but the project remained at the discussion stage because the parties could not agree on a route. The United States favored a coastal road while the Canadians preferred one farther inland. The conflict was finally resolved by adopting a prairie route proposed by the Corps. This route, nicknamed the ALCAN (Alaska-Canada) Highway, connected air bases of the Northwest Staging route from Edmonton to Fairbanks. It crossed through Dawson City where there was a railhead, and it included more level terrain than the other two. It was also less vulnerable to attack than a coastal road. The bombing of Pearl Harbor in December 1941 accelerated defense planning and construction in Alaska much beyond the Planning Board's 1940 projections for two air bases at Fairbanks and Anchorage, three naval bases at Kodiak

Island, Unalaska and Sitka, and extension of the CAA program to Alaska.²³

Planning began immediately after the bombing with Brig. General C. L. Sturdevant, Assistant Chief of Engineers, responsible for highway construction. The Navy opposed the road, believing its warships could keep sea lines clear of enemy ships, and the Army questioned assigning crucial manpower and supplies to the project. Undeterred, President Roosevelt issued a directive on February 14 to begin construction. Sturdevant first proposed a pioneer road that would be widened later. The Corps established a northern and southern sector at Fort St. John and Whitehorse, and divided the work into segments, creating a Northwest Service Command in Whitehorse. The first troops of the four regiments assigned to the project arrived at Dawson Creek on March 2, but the initial task of laying the road was hampered by lack of reliable maps. In order to build the road as quickly as possible, the government dispatched an immense contingent of men and materials to the Alaskan wilderness. In the haste, machinery was destroyed and many soldiers lost their lives.²⁴

The Corps was assigned another ambitious transportation project, a trans-Canada-Alaska railway which involved Seattle District's Anchorage Office. The route was to have connected Prince George, British Columbia, to the port of Teller on the Seward Peninsula. A pipeline was also planned from Tanana to Teller. Although the railroad was not built, the survey constituted another major effort to open communication lines to interior Alaska. More so than with the highway project, the Corps gathered information on areas tributary to the proposed route, including present and projected populations and resource development. In April 1942 the Division Engineer requested Seattle District to undertake a field reconnaissance, and the Anchorage Office dispatched field parties to investigate ocean terminals from St. Michael to Kotzebue, and routes - both rail and highway - to all possible seaports from Norton Sound to Point Barrow.²⁵

Of all the terminals surveyed, the Corps was unable to find one harbor where ocean vessels could dock. Along the coastline, ships had to wait from two to eleven miles offshore for lighters to move the cargoes in and out. At St. Michael and Nome harbors, the busiest terminals in that part of Alaska, ships had to anchor in the open sea. Further, any port north of the Bering Strait would be open only three months, and those south of the Strait were ice-free for five or possibly six months if ice breakers were used. The report found that the best route for a highway or railroad was westward from Fairbanks through the Tanana Valley and then to the Bering Sea, a practical but difficult route.²⁶

After a second, more thorough investigation in early 1943, Seattle District Engineer Colonel Peter P. Goerz and the National Resources Planning Board disagreed on the usefulness of the railroad, particularly in linking roads, rivers and ports. Seattle District perceived these links as a necessary part of the project, ensuring a suitable flow of material over the railway to justify its construction. But costs of improving navigation were judged of doubtful value. The ten-mile stretch of the Tanana above its confluence with the Yukon was exceedingly narrow, and the Yukon River, once the principle artery of interior Alaska, was presently used only for mining operations in an area that had only 2,000 people. Nonetheless, Seattle District identified favorable sites for river-rail terminals, transfer points, and connections with the Fairbanks-Seward line, and it remarked on the considerable volume of tonnage to be routed to the military establishment at Nome.²⁷

In 1943 with the lessening of military danger in the Pacific, the project was abandoned. In the meantime, the ALCAN highway had been completed and airfields expanded. Nonetheless, Pacific Northwest congressmen and private business kept the railway project alive. In 1960 the Alaska International Rail and Highway Commission, on which the Corps had two representatives, authorized a survey of the economic feasibility of overland routes, including a railway between Alaska and the other states. Although Seattle District's 1942 and 1943 reports had been classified "confidential" and "secret" by the War Department, they contained valuable information for peacetime use and were subsequently made available to Pacific Northwest politicians and Canadian agencies. The "secret" restriction was finally removed in 1969 when the reports were needed for developing routes for the oil pipeline.²⁸

4. Post-War Planning: Defense and the First Rivers and Harbors Comprehensive Reports

The infusion of money and men into Alaska for post-war defense construction had an enormous impact on Alaska. After an initial curtailment of defense spending immediately after the war, tensions between the United States and the Soviet Union brought thousands of troops and millions of defense dollars back to the territory. The construction of military bases and civilian and military airports escalated the Alaska economy to a boom level. In north central Alaska, Fairbanks and Nome retained their strong positions with military traffic replacing mining which the War Production Board had suspended in 1942. Post-war changes for the Corps meant re-organization, and after demobilization, a massive buildup of defenses in response to the Korean War and the Cold War. In 1946 the Corps established a new Alaska District with headquarters in Anchorage, but it had authority only for military works until 1949 when it assumed both military and civilian functions. In the early years, the new District still operated under two commands, the North Pacific Division and the Commanding General of the Alaska Command. Under the Alaska Command, the District served two clients in its construction program, the Army and the Air Force. According to Major General William E. Potter Alaska District Engineer at that time, the Alaska Command "determined what they needed and then it was up to the Corps to support the request before the Congress."²⁹

Basically, military construction in the 1950s and early 1960s was a response to the new strategy of a heartland defense for Alaska. This meant abandoning defenses on the Aleutian Islands and building massive air bases at Fairbanks and Anchorage. There were several factors involved. Although the military believed at this time that ground forces would be of little value in future wars, troops were brought back to Alaska to protect new military installations. The Defense Department also judged that future warfare would be aerial, involving long-range bombers and nuclear weapons which needed bases and installations. Because of the growing Soviet capability in the air, the United States also needed an early warning and air defense system, particularly since guided missiles supplanted the bomber. Finally, the conflict in Korea increased the importance of Alaska as a supply base and

mobilization route. Although military construction overshadowed civil works from 1946 to 1960, the District completed and maintained several harbor projects. Because of Alaska's extended coastline and dependence on ports for fishing trade and shipments to the interior, harbors were extremely important to the Territory's development. The projects included improving Ketchikan Harbor, and Wrangell Narrows and Harbor in southeastern Alaska. Military and civilian projects were closely related, for despite the billions of federal dollars invested in Alaska, it was still a "primitive frontier," a "region of magnificent distances, lethal cold, forbidding terrain, and a still totally inadequate system of communication and transportation." On a domestic level, Alaska lacked a modern economic and social infrastructure that could support the defense effort. The Corps' role in developing military installations and water resource projects helped create a permanent, stable base for industrial and social development represented by the growth of service industries, private housing, and new public businesses.³⁰

A major and immediate problem of post-war Alaska construction for both military and civilian programs was the transition from war to peacetime operations, accompanied by labor shortages and contractor's squabbles. The shift from military expediency to normal peacetime programs also meant more careful scrutiny of budgets and operations that were now sharply reduced. As General Potter remarked, "But the reestablishment of peacetime discipline among the people in the armed forces, and also the reestablishment of financial discipline in the Corps, recovering from the World War policies of get-things-done-the-hell-with-costs, you know, took a little [time] establishing." According to Potter, the District's accounts were not believable and its costs were out of line. When Potter arrived in 1948 as the new District Engineer, Congress was holding back appropriations for Alaska. He found that funds were inadequate to continue the \$100 million of work in progress. In order to meet the crisis, Potter deferred construction at Ladd Field, deleted some projects at the port of Whittier, and suspended others begun with fiscal year 1946 funds, stating that they would be considered complete. Work crews deserted the sites, leaving structures of steel beams in what was termed the "year of the skeleton monuments." Other projects were put into use despite their lack of paint, insulation, plumbing and heating.³¹

As Alaska construction once again accelerated in the late 1940s, labor shortages, and problems with contractors, housing conditions and supplies plagued the District. In fiscal year 1949 the District awarded contracts worth \$49 million to construct housing, utilities, warehouses, powerplants, and other facilities at Elmendorf and Eielson Air Force bases and at communications sites throughout Alaska. Expenditures for military construction peaked at \$160 million in 1952, and then steadily declined to \$120 million in 1953, to less than \$100 million in 1956, and to \$70 million in 1962. Civil works expenditures remained near \$1 and \$2 million throughout the 1940s and 1950s and did not exceed those for military construction until 1965. In that year, civil works expenditures were at \$40 million and military works at around \$35 million.³²

In order to manage military construction in the post-war period, the District used a cost-plus-fixed-fee system instead of the regular bidding procedures. Under this system, the Corps reimbursed the contractor for his costs and then awarded a fixed fee at the end of the contract. In areas like Alaska where work must be completed quickly and under difficult circumstances, this arrangement attracts contractors

The Bar Harbor floating breakwater at Ketchikan.



who otherwise would not bid on the project. Because this system is more susceptible to abuse, the work must be more closely supervised. Under General Potter, Alaska District reverted to the bidding system. Contracts were advertised throughout the United States, and Potter traveled to Seattle once a month to open bids.

Military and family housing became a priority in the post-war construction period. Housing contracts in 1949 totaled \$45 million, and from 1949 to 1960 rose to \$98 million. Other priorities were rehabilitation and improvement of army docks at Whittier and Anchorage, extension of runways at Fort Richardson, and construction of a new runway at Mile 26 at Fairbanks which entailed building a small city for 1,000 men. Later stages of military construction involving the District included the Aircraft Control and Warning Systems on the coast and in the interior; the Ballistic Missile Early Warning System which superseded it; the Missile Identification Detection and Alarm System; and an electronics communication network known as White Alice, completed in 1958. Between 1959 and 1961 the District supervised the construction of 32 microwave stations to relay messages south to the Pentagon, and two other communication systems to support military navigation.³³

Although obtaining construction money was generally not a problem, the District had to contend with labor shortages common throughout the United States and with inadequate housing and high living costs for workers who migrated to Alaska. The result was a rapid labor turnover. Consequently, the District devoted much administrative work to adjusting problems caused by labor turnover and shortages. In 1957 the District prepared a summary of problems affecting its personnel in this region where most food supplies had to be flown in and bread cost \$1.00 a loaf. Furthermore, since 1946 the Corps' personnel policies had become more restrictive. Reduced overtime, limiting base housing to a few key employees, and the high cost of off-base housing frustrated the District's work force. Employees were no longer allowed to buy from the commissary or take advantage of the post exchanges or the APO, or to enjoy other privileges of those



The Port of Whittier, constructed during World War II and expanded in the 1950's as a small town for Army personnel. Now used as a port and terminal of Alaska Railroad.

living on-base. In addition, the government increased employment contracts from one to two years while reducing paid vacation time. The District concluded that a family in the general service grades one through eleven could no longer make a living unless both spouses worked, and many qualified employees with children had left. "With full employment in the states, recruitment is at a standstill. The privilege of working for the Government in Alaska is not sufficient inducement by itself for the men to leave family and friends, live in isolated areas in sub-standard living conditions, and work under harsh conditions with less real pay than he can get,



Much of the construction at Fort Wainwright was done during the 20 years following World War II.

for the same and more pleasant work in the states or other parts of the world." Those who could be recruited were "for the most part only marginal people." The result was inefficiency and added costs.³⁴

The District found that although a period of work slowdown in the fall was typical of Alaska construction and the approaching winter, it was increased by the "restlessness of seasonal workmen," eager to get home. Consequently, it was forced to rely on skeleton staffs in technical offices who, nonetheless, succeeded in accomplishing a great volume of work. Division Engineer Colonel Emerson C. Itschner brought the problem of understaffing, or as he termed it, a "spotty staff," to the attention of Chief of Engineers General Sturgis in May 1953. Sturgis suggested the temporary remedy of borrowing highly qualified Corps civilian personnel for temporary duty of four to six months. The Division initiated the program that month. Then in 1956 Alaska District Engineer Colonel William C. Gribble tried another approach. In anticipating a workload well over \$200 million for the next two years, he asked all employees to help recruit friends and previous associates for critical vacancies.³⁵

These problems of a "spotty staff" and work slowdown were intensified when coupled with the difficulty of excavation and construction in permafrost and extremely cold weather, shortages of machinery parts and equipment, and problems in construction design. Despite all, the Corps completed these facilities – some in the most isolated and rugged parts of Alaska – without significant delay. "It is evident," the District commented in 1951, "that the problems of distance, labor and materials characteristic of Alaska construction, are not insurmountable." Proof of that came in the increased bidding for contracts, from an average of four in March to more than nine in the last quarter of that year. The next year the District reported a marked improvement in construction progress despite expected annual strikes. The improvement was due to several circumstances: the new lump-sum contracts introduced in 1948; experience gained by contractors and District personnel; improved construction methods, design and management procedures; and more stringent control of labor

wages. Along with this, construction firms from a wider area were becoming interested in bidding on contracts, partly as a result of more detailed information from the District. It was even becoming unnecessary to rent government equipment to contractors. And, finally, labor shortages eased as the permanent population increased.³⁶

5. Civil Works and Comprehensive Planning

The civil works program in Alaska was small in comparison to the military construction program and to civil works programs of the other districts. Water resources development grew out of studies initiated by the 1948 Flood Control Act which authorized the Corps to undertake preliminary examinations and surveys for flood control and related purposes in the United States and its territorial possessions. A 1950 amendment to that act authorized the continuation of the studies in Alaska. In 1956 as military construction continued its decline from the peak year of 1952, the ongoing comprehensive studies of Alaska's water resources were providing optimistic speculation on the future of the District's public works program.

Playing a major role in managing Alaska's resources, the Department of Interior prepared its own comprehensive survey of water resources. When the territorial legislature asked the Bureau of Reclamation in 1949 to include Alaska in its programs, the Secretary of Interior authorized \$150,000 for a reconnaissance report that year. The report remarked on the relationship between military and civilian programs in Alaska: "It is interesting to note that the military authorities feel that the military works being constructed in Alaska, however modern they may be, are not sufficient to provide local security or protection to the United States. Alaska must have more people, more railroads, more farms, more industries." General N. F. Twining of the Alaska Command reiterated this statement by observing that the over-all defense of Alaska depended upon two closely interrelated factors: military facilities and the civil resources. He proposed that "to the

extent that civil facilities are developed to a level which will permit a self-sustaining economy for a full development of the natural resources of the Territory, the expenditures for purely military works may be reduced." Among the critical civilian needs Twining noted were private housing, highway improvements, and hydropower resources for domestic industrial plants³⁷

The Corps' survey of Alaska's water resources was accomplished through a series of interim reports. The ten reports resulting from the 1948 and 1950 legislation were issued from 1954 through 1964 as House Documents. The order of publication suggests the comparative development and importance of water resources in the main geographical divisions of Alaska. The first reports were on southeastern Alaska and incorporated the territorial (and later state) capital of Juneau; Cook inlet and tributaries, including Anchorage; the Copper River and Gulf Coast with the important fishing ports of Cordova, Valdez and Seward; and the Tanana River Basin in which Fairbanks is located. Other reports published from 1954 to 1962 were on Kodiak harbor, southwestern Alaska, northwestern Alaska, Yukon and Kuskokwim River basin, and a hydroelectric project at Bradley Lake.

In December 1949 Seattle District completed the first report on navigation problems primarily in southeastern Alaska. It included information from 24 public hearings held in the late 1940s and from informal discussions with local officials, fishery and marine interests, and other federal and territorial agencies. In order to augment its insufficient data on small boat navigation, the District also distributed questionnaires to owners or operators of small boats that used the main Alaskan harbors. Of the 5,000 questionnaires distributed, 600 (12 percent) were returned. The information thus collected formed a basis for many of the estimates and recommendations. The report was conceived as the beginning of long-term programs for navigation improvements, and it reviewed the importance of rivers and harbors to Alaska's life and economy, navigation problems, and need for harbor and river work. Subsequent reports followed this format, offering a summary of economic conditions in Alaska during the period in addition to specific recommendations for water resources development.³⁸

Southeastern Alaska

The Division's February 15, 1952 report on southeastern Alaska examined navigation, flood control, hydroelectric power and other possible uses of water resources. It found that the only justifiable projects at that time would be improvements for small boats. Geography hampered transportation, but fortunately the region possessed waterways small boats could navigate safely. With 4,000 boats operating in the inland passage during the summer, navigation improvements would assist most of the population, over one-half of whom were involved in the fishing industry. Because the fishing industry was believed to be at almost maximum efficiency, the region was eager to develop other local industries. The most feasible one was wood pulp which could take advantage of large forest reserves. A pulp mill was being built at Ketchikan, another was planned for Wrangell, and the Division projected that by 1975 the forest products industry would overtake fishing. New industrial growth depended on the availability of low cost power, but the high construction costs of most potential projects argued against any immediate development. Another major drawback to hydroelectric development was the dispersment of power load centers, creating communities that

were independent economic islands. Individual power loads were small, and small inefficient plants had been combined into one system that charged high rates. Consequently, some plants burned diesel fuel. At Juneau, where government services had expanded the population, the demands for power in the immediate future would be hampered by the lack of storage space on nearby rivers.

After investigating 83 potential hydroelectric projects and reviewing 117 others proposed by the Federal Power Commission and the Forest Service, the Division concluded that with a normal growth rate of power loads, it would be most logical for local power companies or municipal utilities to construct them. Only if power demands increased rapidly would the federal government be justified in developing water projects.³⁹

Cook Inlet and Tributaries

The Alaska District completed the second report on Cook Inlet and its tributaries in January 1950, but it was not published as a House Document until 1957. The Chief's Office decided that additional hydroelectric and navigation studies of the area would be undertaken later, and they subsequently were completed in 1960 and 1963 respectively. At the time of the first report, Anchorage was beginning a phenomenal growth that would make it the population center in just a few years. Located on Cook Inlet, Anchorage was directly connected to Fairbanks, other parts of Alaska, and to the continental United States by a highway system. The city had prospered from military construction and installations, and although fishing was the principal industry, agriculture added to the region's growth.

Transportation held the key to development in this part of Alaska. High transportation costs impeded the economic growth of Anchorage and Cook Inlet, although proposed rail links to Fairbanks and Seward were expected to alleviate the situation. Irregular service and delays in receiving construction materials also plagued the region. Because Alaska's geography encouraged air transport, Anchorage and interior Alaska had more light planes per capita than any other region in the world. This created an important industry and promised to make Anchorage a service stop on the circle route between the United States and Asia.

Water transportation remained a primary means of commerce. In 1950 one-half of the cargo transported into the interior through Anchorage arrived by water and was transferred to rail at Whittier, Seward and Anchorage. Furthermore, Anchorage depended on shipping for more than 90 percent of its food and supplies and for the development of its mineral resources. Despite the existence of a deep sea channel in Cook Inlet extending into Knik Arm in the northeast and Turnagain Arm to the east, shorelines had extensive shoals and were exposed to storms. Strong currents and tides, ice floes, and shallow depths created major navigation problems. The lack of adequate harbor facilities at Anchorage was a major deterrent to military and civilian development. Judging that an enlarged and deepened harbor open year round, or even for eight months, would promote national defense, the District recommended that the federal government, and not the people of Anchorage, should assume all costs for funding the project. The report also recommended the development of small boat basins at Seldovia, Homer, Ninilchik, Kaselof, Kenai and Anchorage, although only the first three were judged as immediately justifiable.



Cranes at the modern port of Anchorage.

Both the Division Engineer and the Board of Engineers recommended full federal participation in creating a deep draft harbor at Anchorage, but the Bureau of the Budget and the Chief of Engineers disagreed. The Army believed the ports of Seward and Whittier with an alternative port at Valdez would meet mobilization requirements, making federal improvements at Anchorage Harbor unnecessary for defense. In addition, the Anchorage project would not be in accord with the Administration's program that favored private over government development. The Chief's Office stated that even though a port development would result in substantial national benefits, full development of the facility as a federal responsibility was not warranted. Undaunted by this unfavorable report, Anchorage voted a bond issue of \$2 million to begin the project in October 1954. It completed the construction of deep water port facilities and a new municipal dock without federal aid.

Small boat navigation remained a vital interest into the 1960s. Although the completion of small boat harbors at Seldovia, Homer and Ninilchik had significantly increased small-boat navigation and marine industries, the District urged additional improvements. Because of a surge in boating activity during the 1950s, only 23 percent of the commercial fishing craft could find moorage in these three harbors; the remainder had to anchor in river mouths or in the few natural anchorages. Boat owners had to use tide flats to repair their boats. The District recommended \$1,845,250 in federal funds for small boat harbors at Anchorage and Kenai, and removal of rocks at the mouth of Kaslof River to assist the development of adjoining communities and lead to a more self-sustaining civilian economy. It advised further studies on a harbor of refuge.

The report found that demands for power and interest in industrial development increased with population growth and expansion of the military base at Fort Richardson. Local utilities that depended on diesel and steam plants, many of which were obsolete and makeshift, anticipated power shortages. Numerous small and inefficient power plants along with the high cost of fuel and diesel oil had created excessively

high power rates. Like elsewhere in Alaska, the solution appeared to be construction of larger and more efficient plants producing cheaper power, thereby attracting new customers and more per capita use by present users. The District recommended for immediate construction three projects at Eklutna, Cooper Lake and Crescent Lake and an interconnected transmission network to tie generating facilities to load centers. The estimated cost was \$45,654,000, but the District was confident that producing a surplus of low cost power would increase use and promote the local economy as had occurred elsewhere in the Pacific Northwest. The report also advised incremental development of hydropower projects. Because the Eisenhower Administration was reluctant to sponsor hydroelectric and small boat navigation projects, the District recommended Bradley Lake project as a compromise between a small, inadequate private project and a more massive one. However, ongoing explorations for oil and natural gas in the 1960s promised a competitive source of power, making larger hydroelectric projects less attractive. In 1980 the Bradley Lake project was still under study.

Flood control was another concern in the Cook Inlet area. Flood damage occurred along streambanks during runoffs in June and July, but flooding and flood control work was relatively minor because few people inhabited the flood plains. The town of Talkeetna periodically sustained some flood damage from the Talkeetna, Susitna and Chulitna Rivers which were eroding their banks. Although the District constructed brush and timber fascines along the Talkeetna, it considered a stone revetment unnecessary. In the 1960s the District Engineer denied requests for flood control assistance along the Matanuska and Little Susitna Rivers because of the marginal value of the land, and lack of flood zone laws and local sponsoring agencies to guarantee cooperation.

By the time the District completed its review of the first interim report on Cook Inlet, the area had experienced solid growth and was becoming less dependent on the military economic base. Oil explorations on the Kenai peninsula and the northwestern part of the inlet promised a stable economy, and annual revenues from fisheries, minerals and forest

products were steadily rising. Population in the Anchorage metropolitan area increased by 260 percent from 1950 to 1960, and new homesteaders were arriving to settle uninhabited land.⁴⁰

Copper River and Gulf Coast

This region lies between the Cook Inlet-Anchorage area and southeastern Alaska. Drained by the Copper River, it encompasses the southwestern tip of the Kenai peninsula and its islands eastward to Mount St. Elias, including the islands in Prince William Sound and the eastern coast. Its historic importance stemmed from the ocean ports of Seward, Valdez and Whittier which are terminals for highways and railroads into the interior. Cordova had been an important railroad terminal until 1938 when copper mining operations in the Chitina River Valley collapsed. But it survived as a port and center for fish canneries. Like other coastal regions in this part of Alaska, fishing constituted a major industry, employing over half of the population. Generally people lived in isolated fishing communities and along the highways leading into the interior. Part of the economy depended on tourist and service industries which included outfitting for big game hunters.

The high volume of commerce through the ice-free ocean ports of Seward, Whittier and Valdez, according to the survey, was out of proportion to the area's small settlements and development. Since land routes between the coastal communities were impractical, harbor improvements were essential to the economic well-being of these towns. A good harbor would facilitate transferring - from boat to truck or railcar - cargo destined for interior Alaska.

The survey of power supplies and needs concluded that here, like in southeastern Alaska, it would be impractical to connect the four large load centers of Seward, Cordova, Valdez and Whittier into one system because of their isolation and the rugged terrain. It recommended independent plants for Cordova and Valdez, and connecting Seward and Whittier to proposed hydroelectric developments around Kenai Lake. Present generating facilities were judged adequate, but high costs hindered any large-scale industrial expansion or increased usage. Although a supply of low cost power was desirable, large hydro projects were judged impractical, and the District advised against any federally funded project. The Copper River has enormous power resources, but large amounts of silt and sediments and the blockage of migratory fish runs ruled against a project there. The District also acknowledged that the problem of fish passage would have to be solved before any construction could begin, a position the Department of Interior and the Fish and Wildlife Service applauded.⁴¹

Southwestern Alaska

The geographically complex southwestern region has four mountain ranges and numerous islands and harbors, including the Alaskan peninsula and the Aleutian chain. Having no railway or road connections with the rest of Alaska, it depends on water-borne transportation. In the interior, roads concentrate at populated areas leaving cross country travel to trappers and natives. Over the years shippers developed a land-water route across the barrier of the Alaskan peninsula using two portage roads built by the Alaska Road Commission. Still, the lack of deep sea harbors and the need to use lighters, especially in Bristol Bay, hindered ocean shipping. Passengers and mail service depended on numerous scheduled and chartered airplanes. Although the economy of southwestern

Alaska was based on the seasonal salmon industry, the construction of military installations greatly increased the stable population from 6,976 in 1939 to 16,055 in 1950, mostly on the Kodiak and Aleutian islands. Afterward, as military construction declined, the area looked to recreation and oil as possible new economic bases.

Among proposals to improve navigation was a locally supported plan to construct a water route across the peninsula connecting Cook Inlet with Bristol Bay, eliminating the 1,000 mile trip through Unimak Pass. After studying different schemes for constructing a channel and an extensive lock system, the District recommended against the plan because it would benefit only a small amount of cargo. The District did recommend improving boat harbors at Kodiak and Dillingham and on the lower Naknek River. Because of the small population, the District concluded that federal funds could not be justified for hydroelectric projects or flood control work.⁴²

Northwestern Alaska

In this, the most remote area of Alaska, communication with the outside depended exclusively on air or water routes. There were no highways or railways, and the only existing roads were short branches connecting communities and mining settlements on the Seward Peninsula. The ice-free season ranged from four and one-half months at Nome to only a few weeks on the Arctic coast. Consequently, the 1930 population of 8,500 remained static through 1950.

In the 1950s power development appeared unlikely for the near future. The District was aware of oil and gas resources on the Arctic shelf which the Navy had investigated, but the information was classified. Arctic weather, topography and hydrology made construction of low-cost hydroelectric projects to replace diesel plants impractical. The most crucial need was a deep sea port as most cargoes now had to be transferred to smaller vessels. Shoals, storms and ice floes increased shipping hazards. The District recommended constructing a port at Kotzebue Sound near government military installations, and smaller channel improvements for boats and barges at Norton Sound. However, none of the projects could be economically justified.

The District made a stronger case for developing ocean and land routes to military installations like the Distant Early Warning System on the Arctic slope. Construction and supply of the warning network had created a tremendous logistic problem for the Navy, requiring movement of up to 100 ships into the Bering Sea and Arctic Ocean during the short period of open navigation. Each year in early summer, the military fleet followed the retreating ice pack north to the major destination of Point Barrow to unload and then retreat before a north wind drove the ice pack back to shore. A part of the flotilla continued east to Barter Island, 80 miles from the Canadian border. There were no harbors of refuge along this route, and ships spent most of their time waiting for the ice to clear the shores.

The District presented a plan to increase the success and safety of the naval mission and also lower costs. Deep draft vessels would take cargoes as far as Port Clarence, where they would be transferred to sturdy shallow-draft boats better suited to the Arctic. Small boats could also find refuge in shallow lagoons and estuaries and unload more easily at Point Barrow. This operation would reduce the number of ships as cargoes could be shipped in stages to west coast ports. In the meantime, the District planned to investigate a passage from Point Barrow eastward to the Atlantic which would serve as an

escape route for ships caught in the ice pack. Despite difficulties in implementing the scheme, the District believed the military supply line was of paramount importance, and reducing the hazards and cost of that mission would contribute to the overall development of the area.

Another possibility for supplying Arctic bases was the extension of interior roads west, using caterpillar tractors or cat trains along the foothills of the Brooks Range until permanent roads could be built. Ferries would transport equipment and supplies across streams in summer, and shallow draft navigation might be possible on the Colville River to the Arctic, and then eastward to Barter Island and beyond. The lack of an adequate transportation system in this part of Alaska prompted a comparison. The District Engineer described the present situation in Arctic Alaska as strikingly similar to that of the Pacific Northwest several decades ago. The urban population modernized its highways, leaving isolated communities to struggle against great odds in the development of mineral and other resources. At first they could see no economic justification for building roads. "However, the roads when finally built resulted in unanticipated benefits and fully justified the costs. These became the pattern for development of the hinterland which, in the final analysis, supports the larger population centers."

Despite the careful investigation and proposal for an improved shipping system to the Arctic, the prognosis was not optimistic. "Due to the sparsity and scattered population and the present limited stage of resources development of northwestern Alaska," the District admitted that it had found "no project feasible for recommendation at this time." The Board of Engineers in reviewing the report remarked that the U. S. Atomic Energy Commission was giving preliminary consideration to using nuclear explosive to create a deep-draft harbor near Cape Thompson. It thought that the new harbor would encourage the development of oil, coal and mineral resources. Later, the plan would founder over the issue of exploding nuclear devices.⁴³

Yukon and Kuskokwim River Basins

This section of interior Alaska extending from the Canadian border to the Bering Sea along the Yukon and Kuskokwim Rivers encompasses 226,000 square miles. It is the largest geographical unit in the state. Although the Tanana River Basin forms part of this watershed, the District included it in a separate report. In this vast region, gold mining had sharply declined, and the 14,000 people depended on other minerals, fur trapping, construction, transportation, and the maintenance and operation of a few government facilities for their livelihoods. As in northwestern Alaska, economic development depended on a transportation system that would be less costly than the present air transport. Navigation, restricted to four or five ice-free months of the year, was impeded by hazardous coastal harbors. Moreover, since only small boats could navigate the rivers, cargoes were modest and rates expensive. There were, and still are, no roads connecting the coastal ports and the interior. Unlike most other parts of the territory, floods damaged some communities almost every year, particularly with the sudden breakup of ice. Meandering rivers that formed new channels during runoff also eroded land.

In proposing navigation improvements, the District noted that until other dependable means of supplying the outlying areas of the interior had been developed, river navigation must be maintained. The proposed navigation projects included

Bethel, the head of navigation for ocean vessels and point of transshipment of cargoes, and a canal between the Yukon and Kuskokwim Rivers at a point where they were only 25 miles apart. An earlier survey in 1922 had recommended a channel which would have required two portages or tramways to transfer the boats. The Chief of Engineers declared the scheme unworthy of further investigation, but the Alaska Road Commission built the tramways and cleared the river channels. As the system was used only for mail boats, the advent of air mail service terminated its usefulness. The verdict on both the Bethel and canal projects was unfavorable in view of benefits and costs.

In the area of flood control, the District described possible projects at McGrath on the Kuskokwim, a transportation center for the interior which had been relocated twice because of floods; bank protection for Bethel, the head of navigation for the Kuskokwim and an important trading point for that river basin to the lower Yukon; improvements at Fort Yukon in eastern Alaska which had suffered a devastating flood in 1949 during the ice breakup; flood protection at Tanana village, a transfer point on the Yukon where cargoes were reloaded onto shallower draft boats for transit to the Tanana River; flood work at Galena, site of a large Federal Aviation Agency airfield and Air Force installation; and, a flood project at Aniak, below the confluence of the Aniak and Kuskokwim Rivers, which suffered from floods caused by ice jams. The District concluded that these flood control projects were not economically justified because of small populations and lack of development.

The one outstanding water resource of this region was hydropower, with individual projects having a potential greater than any thus far developed on the North American continent. Alaska District Engineer Colonel Christian Hanburger enthusiastically stated that the storage possibilities of major streams were unequaled, and that the preliminary analysis indicated power sites would produce electrical energy at a cost low enough, per unit of energy, to constitute one of the greatest, if not the greatest, resources of the new state. The most beneficial projects would be those capable of producing from one to several million kilowatts. Hanburger suggested that this power could promote the mineral processing industry in Alaska and elsewhere, and transmission lines could deliver power to smaller mining operations. In addition, small hydropower projects would help rejuvenate the mining industry and provide long overdue, low-cost power. Hanburger also believed that the Federal Government should bear the cost of constructing roads to the sites, which in many cases would involve a change in priorities for national highway construction. This year-round access to the interior would stimulate the local economy and open it to mineral, recreational and other developments.

Of the several potential power sites surveyed, Rampart Canyon on the Yukon, was the largest and most promising. The District estimated the lake could be as large as 9,200 square miles in area, comparable in size to Lake Erie. As the Federal Power Commission noted in reviewing the District's report, it would take nearly a quarter of a century to fill the vast reservoir behind Rampart Dam. The project would be massive in other ways, too. It would encompass a complete community for construction and operation personnel, be equipped with fish passage facilities, allow cargo to be transferred around the dam, and have recreation facilities. The District also viewed Rampart and other power sites as

important to the world power supply and to the nation's and region's reservoir of low-cost industrial power.

Rampart was one of a series of dams the Corps contemplated for full hydropower development on the Yukon and tributary rivers from the Canadian border westward to Ruby. Additional dams at Ruby, Circle, Woodchopper and another site near the Canadian border would afford a step development of five reservoirs that would also furnish surface transportation for over 760 river miles. If navigation locks were not feasible, other means of transferring cargoes could be built. In all these projects, dams would have a positive effect on the industrial development of the territory. Alaska District Engineer Colonel Carl Y. Farrell explained this relationship to the Senate Interstate and Foreign Commerce Committee meeting in Anchorage on October 10, 1955: "It is obvious that the development of any of the major hydroelectric possibilities in Alaska will have a tremendous effect on transportation. It is not possible to predict details at this time," he continued, "but the establishment of any large industrial plant would affect air, water and surface transportation to a marked degree." Farrell also acknowledged that because of the importance of the migratory fish runs on Alaska's economy and because such dams would disrupt the runs, engineering solutions like those implemented on the Columbia River would have to be found.

The Fish and Wildlife Service's review of the potential impact of the projects on fish and wildlife resources stated that "without exception, each project in this report is classified as being harmful to fish and wildlife." However, the Service believed that knowledge gained in the investigations and the technological advances employed on the Columbia might hold some future promise for mitigating the fishery on the Yukon and Kuskokwim. It also pointed out that conditions of temperature, food production and ecology were more critical to successful spawning in Arctic and sub-Arctic areas than in the Pacific Northwest. Moreover, no satisfactory solution yet had been found for the downstream passage of juvenile fish around or through dams. Above all, the Fish and Wildlife Service worried that history might repeat itself in these Alaskan river basins: "The greatest problem associated with the fishery aspects of the projects will be insufficient funds and time in which to conduct studies prior to project construction." Concerning the impact of reservoirs on wildlife, the Service believed that reservoirs and inundation of lowland areas would harm habitat for large and small game animals. Because of the importance of Rampart Canyon for all kinds of wildlife, the effects of a dam at that site would be particularly harmful. Backed by support in Congress and among Alaskans, the District recommended further study. Division Engineer General W. W. Lapsley advised the Chief's Office that the District's planning framework and potential projects be adopted as a guide in any future investigations. This pronouncement was important as the Corps proceeded with plans to develop a hydroelectric project at Rampart with considerable support from Congress and Alaskans. The Chief and the Board of Engineers concurred.⁴⁴

Tanana River Basin

The North Pacific Division prepared the report for the last major Alaskan region to be surveyed, the Tanana River Basin which stretches west from the Canadian border 150 miles to its junction with the Yukon. It contains the Alaska Highway which follows the river to Delta Junction and continues to Fairbanks, the second largest city in Alaska. Fairbanks was, and still is, the trade and financial center of the interior. The

termination of land, rail and air routes at Fairbanks, and several large military installations begun during World War II were responsible for the rapid population increases. The population in the Tanana Basin tripled between 1939 and 1950, from 6,500 to 20,000 people, 95 percent of whom lived in metropolitan Fairbanks. Unlike other Alaskan regions, gold mining still constituted a principal industry in the early 1960s, but the basin also depended heavily on government expenditures. In its investigation, the Division considered water resources in relation to the basin's goal of economic self-sufficiency. Anticipating a decline in military spending that had sustained the Fairbanks area, the Division foresaw little increase in mining but a great potential for employment in the oil industry. Because of the basin's central position as the hub of a transportation network, the transportation industry was one of the largest and most active employers in the basin. If tourist services were constructed, the recreation industry could expand. Agriculture experts believed that more land could be opened to development despite permafrost that retarded drainage and decomposition of organic matter.

In assessing the problems of water resource development, the Division reported that navigation on the Tanana was beset by difficulties, including shifting channels and water depths and obsolete equipment. Since most cargoes moved only upstream, there was little justification for improving boats or channels. The major problem was flooding and land erosion. Fairbanks is located on a low plain straddling the Chena, and high flows frequently over-topped the narrow channels of the two rivers. In 1945 the Corps built a dam and diversion dike to prevent the Tanana flooding into the Chena. Although these structures successfully directed overflows from the Chena, flooding still occurred. This became increasingly serious with the rapid growth of civilian and residential projects around Fairbanks and at Ladd Air Force Base. After a 1948 flood damaged military installations, residents requested additional protection. Still, neither the District nor local residents believed that a major storage project was necessary. Discussions centered around alternatives such as a cut-off channel, levees, and diversion of flood water by a small dam not over 37 feet in height.

Hydroelectric power was also examined. In the Tanana Basin, coal and diesel plants provided power, and Fairbanks was constructing a new 3,500 kilowatt coal-burning steam plant. In the outlying areas, a cooperative plant served rural customers. Although the city was not suffering a critical power shortage in 1950, the high rates—almost the highest in Alaska—were inhibiting economic growth. The development of hydropower as an alternative would encounter problems common to those of most other sections of Alaska. Although good sites existed, the installations which could produce low cost power would be too large for prospective loads. Consequently, the report advised that none of the numerous sites considered for development were justified at that time.

The Division also observed that the Tanana River and tributaries supported runs of anadromous fish to spawning grounds. The Division recommended that fish passage facilities be included in future projects, but noted that the proposed projects were not expected to seriously interfere with the runs. In commenting on the report in 1954, the Department of Interior advised that fish passages be provided at the Chena River diversion dam. Chief of Engineers General Sturgis promised full cooperation with the Fish and Wildlife Service in future planning.⁴⁵

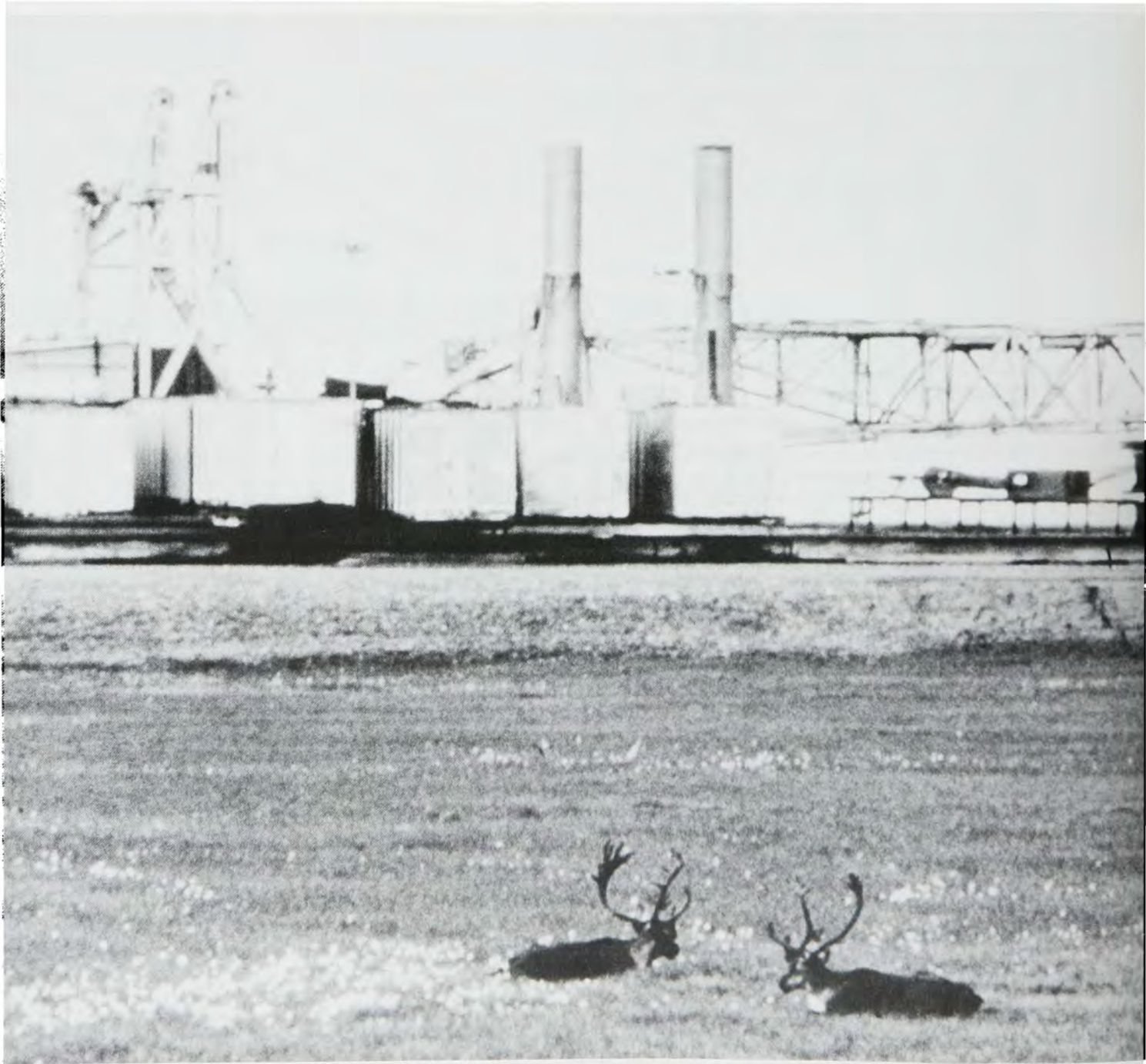
CHAPTER 14. ENDNOTES

1. Raymond's report was published as Senate Executive Document 12, "Report of a Reconnaissance of the Yukon River," 42nd Cong., 1st sess.
2. Morgan B. Sherwood, *Exploration of Alaska 1865-1900* (New Haven: Yale Western Americana, Series No. 7, 1965), p. 27.
3. Ibid, p. 41.
4. Ibid, pp. 8, 194-95.
5. U.S. Army Corps of Engineers, Alaska District, *Harbors and Rivers in Alaska, Survey Report, Interim Report No. 6, Northwestern Alaska*, 1 June 1956, p. 42.
6. U.S. Army Corps of Engineers, Alaska District, *Harbors and Rivers in Alaska, Interim Report No. 3, Copper River and Gulf Coast*, 30 Oct. 1950, p. 37.
7. Sherwood, *Exploration of Alaska*, pp. 11-12.
8. ARCE 1897, 55th Cong., 2nd sess., 3 Nov. 1896, pp. 3487-89, 3634. This report contains Gaillard's interesting description of fish, wildlife, plants and vegetable crops in the area.
9. Dr. Will A. Jacobs, *History of the Alaska District, United States Army Corps of Engineers, 1846-1974* (Elmendorf Air Force Base, Anchorage: U.S. Army Corps of Engineers, Alaska District, 1976), p. 10.
10. U.S. Congress, House Document 39, "Preliminary Examination and Survey of Wrangell Narrows," 58th Cong., 2nd sess., 1903.
11. U.S. Congress, House Document 389, "St. Michael Canal, Alaska," 4 Jan. 1907, 59th Cong., 2nd sess.
12. John R. Noyes, "Waterway Improvements in Alaska," *Military Engineer*, 28:126 (Nov.-Dec. 1936), p. 402.
13. Ibid.
14. James Gordan Steese, "The Roads of Alaska: Work of the Alaska Road Commission," *Military Engineer*, 13:67 (Jan.-Feb. 1921), p. 14.
15. Ibid, p. 2.
16. Millis to Chief of Engineers, 1905 NA, RG 77, 103, 51240.
17. Steese, "Public Works in Alaska," *Military Engineer*, 16:85 (Jan.-Feb. 1924), pp. 13-15.
18. Ibid, p. 6.
19. Col. Edward H. Schulz, Seattle District Engineer to Chief's Office, 7 March 1921 with endorsement of Cavanaugh, 14 March 1921; Lukesh to Chief, 1 Jan. 1920; Maj. Malcom Elliott, Alaska Road Commission to Chief, 24 Jan. 1930, NA, RG 77, 103, 130977/1, 1092/1, /12, and /13 respectively.
20. National Resources Committee, *Alaska: Its Resources and Development, Regional Planning, Part VII* (Washington, D.C.: U.S. Government Printing Office, 1938), pp. 5-6.
21. Ibid, pp. 107-11.
22. Bessey to White, 18 June 1940, Seattle FARC, RG 77, NPD 507, "Pacific Northwest Regional Planning, Vol. 1."
23. Ibid. Stan Cohen, *The Trail of '42: A Pictorial History of the Alaska Highway* (Missoula: Pictorial Histories Publishing Co., 1982), pp. 1, 6-8; U.S. Congress, House Document 711, "Report of the Alaskan International Highway Commission," 76th Cong., 3rd sess., April 1940, pp. 1-3, 10-15. Also see Dod, *The Corps of Engineers: The War Against Japan*, for a more detailed account of building the highway.
24. Cohen, *The Trail of '42*, pp. 10-16.
25. Cpt. James Bush, Jr., "Report on Reconnaissance for Railroad or Highway West of Fairbanks, June 15, 1942," NPD, RHA, Administrative Services Files, "Alaska Railway Study."
26. Ibid.
27. U.S. Engineer Office, Seattle, "Report on Rail and Port Surveys, Alaska, 24 April 1943," Ibid.
28. Carl L. Junge, Alaska International Rail and Highway Commission, "Resources and Transportation Development in Northwest North America," May 1960, Alaska District, RHA, IHF, "Trans-Canadian Railroad Locations."
29. William R. Hunt, *Alaska, A Bicentennial History* (New York: W. Norton and Co., Inc., 1976), pp. 112-13; Gen. William E. Potter, *Engineer Memoirs* (Washington, D.C.: U.S. Army Corps of Engineers, Office of the Chief of Engineers, 1983), pp. 50-51.

30. Jacobs, *History of the Alaska District*, pp. 22-25, 58-60; Hunt, *Alaska*, pp. 114-15.
31. Potter, *Engineer Memoirs*, pp. 48, 50-51.
32. Jacobs, *History of the Alaska District*, p. 134.
33. Ibid, pp. 26, 29-42, 50, 53.
34. "Changes in Personnel Policies During the Period 1946 through 1956 Which Have Adversely Affected the Retention and Recruitment of Personnel in the Alaska District," 28 Jan. 1957, Alaska District, RHA, IHF, "1949."
35. "Report of the Historical Record of Alaska District," 9 Sept. 1951 to 31 Dec. 1951; "Report, History of Corps of Engineers Relating to Current Mobilization, May 1952 to December 1952, Alaska District, RHA, IHF, 228-10; Itschner to Sturgis, 13 May 1953 and Col. A. C. Welling of the Chief's Office to Itschner, 18 May 1953, Sturgis papers; Gribble, District Memorandum No. 70, 9 Aug. 1956, Alaska District, RHA, IHF, 228-10.
36. "Report of Historical Record of Alaska District," Sep.-Dec. 1951; "Report of History Relating to Current Mobilization, May-Dec. 1952, ibid.
37. U.S. Congress, House Document 197, U.S. Department of Interior, "Alaska. A Reconnaissance Report on the Potential Development of Water Resources in the Territory of Alaska for Irrigation, Power Production, and Other Beneficial Uses," 82nd Cong., 1st sess., Jan. 1952, pp. 3-5, 285-86.
38. U.S. Congress, House Document 44, "Report on a Partial Preliminary Examination and Interim Survey of Harbors and Rivers in Alaska," 83rd Cong., 2nd sess., 1954, pp. 7, 10, 92.
39. U.S. Congress, House Document 501, "Southeastern Alaska," 82nd Cong., 2nd sess., 1954.
40. Alaska District, *Harbors and Rivers in Alaska, Survey Report, Interim Report No. 2, Cook Inlet and Tributaries*, 20 Jan. 1950; *Review of Interim Report No. 2, Part 1, Hydroelectric Power, Bradley Lake Project*, 1 June 1960; *Part 2, Navigation and Flood Control*, 31 May 1961, copies in Alaska District Office. The first two reports were also published as House Document 34, 85th Cong., 1st sess., 1957, and House Document 455, 87th Cong., 2nd sess., 1962. Jacobs, *History of the Alaska District*, pp. 29, 121-22.
41. U.S. Congress, House Document 182, "Copper River and Gulf Coast," 83rd Cong., 1st sess., 1950.
42. U.S. Congress, House Document 390, "Southwestern Alaska," 84th Cong., 2nd sess., 1957.
43. U.S. Congress, House Document 99, "Northwestern Alaska," 86th Cong., 1st sess., 1959.
44. U.S. Congress, House Document 218, "Interim Report No. 7, Yukon and Kuskokwim River Basins, Alaska," 88th Cong., 2nd sess., 1964. Quote from Farrell in typescript of news release, "Senate Hearing," 10 Oct. 1955, Alaska District, RHA, IHF, 228-10. The Interior Department was also investigating the Rampart Canyon at this time. See letter of Kenneth Holum, Secretary of the Interior to Gen. Walter K. Wilson, Chief of Engineers, 17 Sept. 1963, in House Document 218.
45. U.S. Congress, House Document 137, "Tanana River Basin, Alaska," 84th Cong., 1st sess., 1955.

XV

ALASKA ENERGY AND ENVIRONMENTAL CONCERNS



The State of Alaska is unique militarily, economically and geographically. One does not need to turn past page one of any newspaper to be aware of the tremendous future of the region. But that future depends on planning and engineering capability, probably far more than any other discipline – a capability which the Corps alone is able to assume.

Brig. General Roy S. Kelley
October 1969



Prudhoe Bay.

1. Hydroelectric Projects for Alaska

The "308" reports on Alaskan regions emphasized the enormous potential of hydropower, particularly on the Yukon River and in the Juneau area. In the late 1950s, through the 1960s and into the 1970s, the Alaska District pursued hydroelectric projects at Rampart and Snettisham that had been described in the reports. Here in Alaska as in the other Pacific Northwest states, environmental issues and markets played a decisive role. The long debate over the Rampart project on the Yukon exposed a deep division between pro-development forces, led by the outspoken champion of Alaska self-rule, Senator Ernest Gruening, and environmentalists who perceived Alaska as North America's last wilderness. Of major concern to Alaska District was finding substitutes for military projects. The District Engineer Colonel Carl Y. Farrell addressing this need in 1954 commented that despite the expected decline in military construction, he viewed with great interest the possibility of other developments within the Territory. He believed that the best stimulant and an absolute necessity for private developers were adequate harbors and plentiful hydroelectricity supplies.¹

As work on the interim "308" reports progressed into the 1950s, the Rampart project gained increased prominence. A 1955 news release on Yukon power stated that the Corps' studies were indicating that Alaska's greatest natural resource might well be its hydroelectric potential. It emphasized that Rampart, approximately one hundred miles northwest of Fairbanks, could become the biggest energy producer in Alaska with a potential generating capacity of three million kilowatts. The research first assumed a major benefit of hydropower development on the Yukon would be to enhance navigation by creating slack water. Further investigations revealed that the initial estimate of potential power from the Yukon watershed was far too small. With the survey still incomplete in 1956, the District reported that data confirmed the availability of nine million kilowatts of installed plant capacity on the Yukon watershed. Offering a comparison, the District pointed out that after three-fourths of a century and hundreds of dams and many millions of dollars, some 23 million kilowatts of hydroelectric power had been developed in the United States. On just two Alaskan rivers, the Yukon and Kuskokwim, it was possible to develop nearly one-third of this, around 7.2 million kilowatts of firm power, that is, the amount of power guaranteed to be produced at a certain rate and is non-intermittent. Rampart alone was capable of generating 3,110,000 kilowatts in comparison with Grand Coulee's production of 2.2 million. The addition of three more dams on the Yukon would bring the figure to 6.6 kilowatts.²

The possibility that hydropower projects could bring in over \$200 million for civil works projects generated enthusiasm in the District. Although this did not materialize and funds gradually declined for both military and civilian projects during the next several years, the District remained confident in 1957 that its "308" reports on Alaska would result in river and harbor improvements and hydroelectric projects, including numerous small private developments. It believed all of these projects, bolstered by a new power network, would bring substantial economic growth to the entire state.



Vicinity map of Rampart project

In addressing the question of power markets, the District used the example of power shortages in the North Pacific Division. It noted that the industrialists who built large plants to take advantage of low cost power from Bonneville and Grand Coulee now were experiencing power shortages. This demand for more power was expected to absorb power from the few remaining higher cost hydro sites, and consequently stateside industrialists, bankers and business leaders were expressing interest in Alaska's power resources. District Engineer Colonel Pierre V. Kieffer contended that history was repeating itself in Alaska: "We were constantly reminded that cheap power, where it can be used, has never gone begging, and I for one think that it never will."³

The concept of Yukon power stimulated imaginations, including that of the author of an engineering article who described the "fabulous" construction figures produced by projects much smaller than Rampart in the Canadian wilderness. With the lack of available sites for cheap hydropower in the United States, "industrialists were dreaming waterpower dreams," and constructionists were also dreaming of satisfying their "wanderlust yearnings, uninhibited desires to see new country and the craving in the blood to help build 'the biggest' . . . of the biggest, Alaska's Rampart Dam."⁴

Beginning in 1959, the Senate Public Works Committee, at the request of Alaska Senator Gruening, authorized the District to begin a more detailed feasibility study of power sites including core-drillings, estimates and designs. The major cost considerations were the facilities needed to transmit power to plants located 350 miles away at tidewater. Lines would have to cross areas of sub-Arctic temperatures and withstand winds of 120 miles per hour and heavy snow packs. In addition, turbines and generating units would have to be larger than any presently built. When in 1960 the Eisenhower administration threatened to block funding for the studies, Senator Gruening left his hospital bed for a brief appearance in the Senate Chambers to join in the override vote of Eisenhower's veto. The granting of Alaska statehood in 1959 also had helped sway Congressional opinion toward approving Rampart.⁵

Site of the proposed Rampart Dam.



The Rampart project was immense. The District estimated that the dam and powerhouse would cost nearly \$1.3 billion and take eight years to complete. In preparing for this enormous undertaking, Division Engineer General Allen J. Clark appointed an eight-man advisory board to assist Colonel Hanburger develop and review an independent economic analysis of domestic and foreign markets for the power.⁶

The Alaska District and the first workers at the Rampart Canyon site shared enthusiasm for this engineering challenge. Like the ALCAN highway, the saga of men and equipment overcoming Alaskan climate and terrain at Rampart Canyon provided much of the attraction to this intriguing operation. A news release describing the first base camp elaborated on the extreme cold of the Arctic winter with gale-like winds and snow, the mountain barriers and poor visibility. It concluded, "it is a place that the field guys have their own reasons, unlike those of engineers, for thinking that it must be 'dammed'."⁷

Amid this optimism and the allure of taming part of the last frontier, the Alaska District maintained a cautious position. Colonel Hanburger explained that Rampart's feasibility depended on markets for its power, a view that expressed considerably less confidence than Colonel Kieffer's remarks of only a few years before. Other experts were more optimistic. In 1962 a consulting firm completed a market report that uncovered the inescapable fact that not merely could Rampart's power be marketed, but it was needed. The report affirmed that cheap hydropower developed with federal financing would achieve the same results in Alaska as other federal dams had done in the Pacific Northwest. Rampart would lead to the establishment of electro-process industries like aluminum that had important markets in the western United States, Japan, and possibly Europe. In addition, the decision to build Rampart at this early stage in Alaska's history as a state would "greatly encourage the people of the state in their efforts to help themselves, with resulting benefits for the entire nation." An immediate effect of the project would be

the economic activity generated by the construction in terms of supplies, housing and other facilities.⁸

That same year, the Corps of Engineers and the Department of Interior concluded an agreement whereby the Corps would be responsible for the engineering design and construction of all water resource projects in Alaska. The Interior Department would lead studies of natural resource development and operate and maintain the projects. As part of the agreement, the Corps was to continue the Rampart Canyon studies, but the Interior Department was authorized to undertake further marketing studies there and at other sites. In addition, the Department would study the effect of the proposed dam and reservoir on natural resources. The purpose of the agreement was to avoid establishing duplicate construction organizations in Alaska and stimulate broad participation in comprehensive water resources planning. This agreement also affected the proposed hydropower project at Snettisham in southeastern Alaska, one that was considerably less spectacular than Rampart.

In 1961 the Interior Department described the Snettisham single purpose hydropower project as financially feasible, economically justified, and consistent with Congress's intention of promoting the development of Alaska. The Bureau of the Budget also favored the Snettisham project primarily because of the anticipated construction of a newsprint mill near Juneau which would utilize nearby timber resources in the Tongass National Forest. The Bureau additionally recommended that non-federal interests should be encouraged to develop the project first according to the Administration's policy of preferring non-federal funding. It qualified this condition by stating that if this type of sponsorship could not be arranged, "we would not object to construction of the project by the Department of the Interior."⁹

Of the two projects, Rampart received more public attention. The Fairbanks *Daily News-Miner*, with a ten-part series beginning March 1963, joined engineers, developers and

state politicians in promoting Rampart. In its first reports, the *Daily News-Miner* warned that the road leading to either authorization or blocking the project would be a hard one as forces on both sides were gathering ammunition. Uneasy over the effects of this huge dam and reservoir on fish and wildlife, conservationists launched the strongest argument against Rampart. The dam was expected to flood duck habitat on the Yukon Flats, a place many regarded as the greatest nesting area in the world. It would also inundate habitat of fur bearing and big game animals. Furthermore, biologists still had not discovered a reliable method of passing anadromous fish around dams. The Fish and Wildlife Service insisted that the Chief of Engineers withhold approval for Rampart and Snettisham until studies had been completed and measures to preserve fish and wildlife resources had been adopted. It later estimated \$580 million would be needed to mitigate damages, a figure the Interior Department subsequently increased to \$2 billion.¹⁰

The National Wildlife Federation, a determined opponent of Rampart, claimed markets for the power were not evident and demanded public hearings be conducted before Congress be allowed to grant the Geological Survey's request to withdraw nine million acres for the project. In the meantime, the District conducted informal hearings at villages in the path of the proposed reservoir and fielded questions from the public and press. The Fairbanks newspaper reported that Native Alaskans were concerned about the dam, but mainly in regard to training for new jobs and compensation for losing their homes. But, as reported in the *Daily News-Miner*, they were not opposed to the dam. In Anchorage, District Engineer Colonel Kenneth Sawyer assured the Rampart Advisory Committee that the relocation costs for an estimated 1,500 people would be much less than similar projects in the lower states. Confident of the project's approval, the District planned to begin an investigation into a proposed two and one-half million kilowatt dam upstream from Rampart as soon as the final report was completed that summer.¹¹

Any shadow of doubt cast on Rampart did not dispel the optimism of Senator Gruening's camp which praised the project as fortune's child born into a propitious economic and political climate. Proponents of the dam expected authorization and actual construction to begin in 1964, but they also admitted that the enemy was "waiting with a loaded shotgun and a red hot mimeograph machine." Senator Gruening's assistant, George Sundborg, identified the Interior Department as foremost among the opponents. He derided conservationists for failing previously to protect salmon runs from fish traps and pointed out that the Yukon was not used for commercial fishing. Fish were primarily caught by natives to feed themselves and their dogs. He also contended that this was not a major nesting and breeding area for ducks. In denying the charge that development of natural resources was incompatible with wildlife, Sundborg pointed to oil exploration and development on the Kenai peninsula where moose were still abundant. He posed questions for conservationists which are still pertinent. Would a huge reservoir for a hydropower project be preferable to the problem of disposing of nuclear waste? Would one large dam be better than numerous projects on many rivers?¹²

Pro-Rampart arguments of Sundborg and others stressed the importance of the project to Alaska's overall development. In fact, one important rationale for securing the project was the continuing decline of federal funds for military construction. The need for private investment in Alaska prodded

business and political leaders to champion the project, and many of them united to form a pro-Rampart group, Yukon Power for America, which had an estimated budget of \$100,000. The Fairbanks and Anchorage city governments quickly donated \$10,000 each to the group. Opponents had fewer funds but nonetheless were well-organized.¹³

Those opposing Rampart received assistance from an unexpected source. As more was revealed about the project and its possible environmental effects, national criticism swelled. An editorial in the *Tundra Times* reprinted from the *New York Times* reported the U.S. Fish and Wildlife Service estimated that the Yukon River flats contributed 1.5 million ducks and 12,500 geese to Canada and the four waterfowl flyways in the United States. Rampart would destroy almost 2.5 million acres of prime breeding territory which was one-half million acres more than the federal emergency wetlands acquisition program. The *Times* further claimed the dam would displace 5,000 moose and other mammals and block salmon migrations. The National press encouraged conservationists to protest the project to their congressmen, either on conservation or economic grounds of the \$1.3 billion cost of building facilities and transmitting power 2,000 miles to the border between Canada and the lower states.¹⁴

While public debates continued, the District proceeded with design studies and the Interior Department with additional market and environmental investigations to which the Corps contributed \$390,000. In its interpretation of the 1962 interagency agreement, the Department insisted on a cooperative report. Division Engineer General Peter C. Hyzer reluctantly agreed on the premise that "the present alternative of doing nothing and awaiting developments also has certain undesirable aspects."¹⁵

In the meantime, the Rampart project experienced another setback. A state law prohibited Yukon Power for America from forming a citizens committee to promote the dam until the Interior Department released a favorable feasibility study to Congress. This legislation greatly deflated the group's plans to mount a public campaign. Then in February 1967 Alaska Governor Walter J. Hickel announced that a new railroad to open up the Arctic should have priority over the dam. A spokesman for Yukon Power charged Interior Secretary Stewart Udall with joining the conservationists in opposing the project and bottling up the feasibility study. Expecting the report to be negative, the group wanted it released immediately so they could refute it. A month later the Anchorage *Daily News* announced that according to inside informants, the Interior Department's report would doom the project.¹⁶

When the Secretary of Interior finally released the report in June 1967, the conclusions appeared as negative as proponents had feared. Although he judged the Rampart project of limited value, Secretary Udall did create an Alaska Power Administration to market existing Alaskan power. The choice of Gus Norwood as the administrator provided some comfort as he was an outspoken advocate of Rampart. That same year the Senate appropriated funds to the Division to complete its studies and simultaneously approved \$4.7 million for Snettisham, a project considerably less controversial than the one on the Yukon.¹⁷

When released in 1971, the Corps' final Rampart Report noted that the cost benefit ratio was 0.96 to 1. Because of rising interest rates and construction costs, the Alaska District concluded that the Rampart project should not be undertaken, but it acknowledged that a higher growth rate in the power

market could change this. It also stated that there was sufficient evidence that altering the existing natural environment would harm fish and wildlife, a factor that would always weigh heavily against this "biggest of the big" dams. In 1974 Rampart experienced a brief but unsuccessful bid for a reprieve. Alaska Senator Stevens inserted a provision for recomputing the economics of Rampart into a supplemental appropriation act. Division Engineer General Richard E. McConnell hoped that this would smoke out the opposition as well as reassess the project's advantages. Nothing came of this effort except the concern that the trans-Alaska pipeline might interfere with future authorization and impoundment of waters behind the dam.¹⁸

Unlike Rampart, the Snettisham project encountered little environmental opposition. In 1952 the Division had reported favorably on several low-cost hydroelectric power sites in this part of southeastern Alaska, but it noted that such development was not yet economically justifiable. In 1961 the Secretary of the Interior presented a feasibility report to Congress that recommended the construction of a single-purpose project to meet anticipated power needs of Juneau and adjacent areas for new industrial development, primarily a proposed newsprint mill. The report described the project, which would use Crater and Long lakes as water resources, as financially feasible and economically justified. When the paper mill was abandoned, the Interior Department reoriented the project toward supplying an increasing number of public and private users in Juneau. The Department also changed the project to a three-stage one to be built according to the growth of power markets. Instead of a dam, two tunnels would draw water from the lakes into a power plant at tidewater. Although the Bureau of Reclamation had taken the lead in the project, after the 1962 agreement between the Secretaries of the Army and the Interior Department, the Corps became the agency responsible for designing and constructing Alaska's hydro-power projects.¹⁹

Congress authorized Snettisham in the 1962 Flood Control Act, and in 1964 the District began exploratory drilling at Long Lake. In 1966 Congress appropriated the first funds for this innovative project. Deciding against building a dam at Long Lake, the District instead built an underground powerhouse which reduced costs. Savings were also made by eliminating a lining for a tunnel from Long Lake. The District completed the first phase of the project in 1973. The second stage at Crater Lake was deferred because of efforts among some Alaskans to relocate the state capital which would have affected projected power needs. Although nothing came of this, construction of the Crater Lake portion was delayed for a few years.

In its response to environmental and aesthetic criteria, the Snettisham project represented more than new engineering designs. The underground powerhouse structure not only saved \$1.3 million, it provided a more pleasant work-space. Hidden from view, the plant does not disturb a natural wildlife refuge. Moreover, the entrances to the access and service tunnels were designed to blend into the natural features of the site, and sharply peaked roofs keep entrances free from snowslides. In 1974 the District received the Chief of Engineers Distinguished Design Award for the powerhouse.

Environmental considerations also influenced design and construction of transmission lines. The District was forced to discard its original plan for a direct, high voltage cable over the mountains to Juneau. After public discussions in that city, the

District selected a route at a lower elevation. It was planned to be as inconspicuous as possible with minimal visual impact, and care was taken to bypass eagle nesting sites. Crews cleaned a narrow work trail, removing only those trees that could endanger the line. Since no access roads were built for heavy construction equipment, helicopters flew in the towers to prevent further disturbance to the environment.²⁰

Planning for Rampart and construction of Snettisham coincided with a crisis in funding within the Alaska District. From 1956 to 1965 funds increased dramatically for both military and civilian works. Then in 1966 funding sharply declined from \$76 to \$36.6 million. In February of that year, the Budget Bureau reduced funds for civil works throughout the Corps, largely eliminating Alaska's civil works construction program. A major cutback in military construction coincided with deferral of Snettisham as a new construction start in fiscal year 1967. This would have forced a major adjustment in manpower, perhaps even transferring Alaska District's administrative and design functions to Seattle and retaining only a "bare-bones" design staff at Elmendorf. Although the transfer would help the situation at the Seattle District office, it was less clear what the implications would be for the other districts.²¹

As further delays in securing money for Snettisham worsened the situation, Division Engineer General Hyzer worried that a major reduction in force would occur if Congress did not release funds. The small amounts that probably would be allocated would not be sufficient for what Hyzer termed design continuity. The problem was endemic to Alaska and as old as the Corps' history there. As Hyzer remarked, if the Alaska District's present staff were reduced, it would be extremely difficult to recruit qualified technical people in the future. Hyzer forwarded the District Engineer's request for a minimum of \$500,000 to the Chief, hoping to forestall this predicament. Fortunately, Congress released \$750,000 in the fall of 1966, and the next year the Defense Department released deferred funds for the military construction program. Suddenly the District was forced to "scramble to place all the new work under contract." This was accomplished by recruiting temporary staff, requesting authorization for military overtime, and restaffing field offices. Between January and August of 1967, the District succeeded in awarding contracts for sixty projects totaling \$23 million. On June 30 it awarded an initial \$7,084,400 construction contract for Snettisham even though future funding appeared uncertain.²²

While the District and the Division were responding to budgetary problems originating in Washington, D.C., studies on Alaska's hydropower potential and markets continued with a detailed report by the Federal Power Commission. President Johnson's executive order of October 1964 initiated the analysis of long-range development in Alaska in which the Corps participated along with the Bureau of Reclamation and other federal, state and local entities. Emphasizing the economical development of Alaska's power resources, the FPC survey stressed that integrating many of Alaska's separate power systems would increase generating capacity. It stated, "The key to the future growth of Alaska's electric power industry lies largely in the willingness of its members to embark vigorously on a course of planning together for new power sources and system interties." The Commission anticipated that the recent oil discoveries in the Arctic Region would greatly increase markets and lower power costs. It

believed that favorable areas for growth were in the interior and south-central regions.

At the time the Federal Power Commission released its report, many of the 41 hydropower projects in Alaska were less than 50 kilowatts. In addition the percentage of hydropower supplying the total energy needs in Alaska declined from 30 percent in 1950 to 17 percent in 1965. An unanswered question was the federal government's role in developing Alaska's hydropower resources. The national trend in ownership was toward public utilities and away from private plants, many of which had been constructed to supply mines or canneries. Further, the only federal hydropower plant in existence in Alaska before Snettisham was the Bureau of Reclamation's Eklutna Dam. In addition to planning Snettisham, the Corps began restudying the authorized 64,000 kilowatt Bradley Lake project in the Cook Inlet for which an interim report had been submitted in 1960. With assistance from the Corps, the Alaska Power Administration, and the Alaska Department of Natural Resources, the Commission surveyed 245 sites and prepared estimates of costs of firm energy. From this, 76 sites were identified ranging from capacities of 7 thousand to over 5 million kilowatts at costs estimated from \$200 to \$1,800 per kilowatt. The most favorable projects were those located between Anchorage and Fairbanks in the railbelt area, so named because it is the only region with direct rail service between Alaskan cities. Despite the long transmission lines and low costs of operating and maintaining plants, the Federal Power Commission predicted investments would be relatively high. Consequently, it believed most hydroelectric projects built in the future would be multipurpose and funded by the Federal Government.²³

The FPC report contained a mandate for federal involvement in Alaska, but the uncertainty of funds, particularly for civil works, continued to plague the District. In early 1968 a freeze on new military awards forced the Division to reduce field office staffs and uncertain funding for that year threatened the engineering branches. Although the Division was prepared to reduce costs, Division Engineer Elmer Yates pointed out that the District needed to maintain a capability for on-going work as well as for handling disasters like the 1964 Alaska earthquake and the 1967 Fairbanks flood. "I believe we are considered the most effective construction agency in Alaska," he asserted to the Chief of Engineers, "and I feel that it is important that we continue this posture." At the 1969 Budget Hearings in March of 1968, Yates explained the importance of orderly planning. He stated that the relatively virgin but resource-rich state presented a unique opportunity and challenge for orderly development. The growth rate of the dispersed population of 270,000 was twice the national average. Because Alaska had only 5,000 miles of road, navigation improvements were essential, including harbors for the protection of the fishing fleet. Yates cited hydropower development as another pressing need for the growing market centers. One indication of the importance of civil works in Alaska was contained in a listing of 30 projects in the Division's active backlog waiting to be initiated. Twenty of them were in Alaska.²⁴

The Alaska District played a prominent role within the Division in the late 1960s in other ways. The Division considered the Fairbanks flood control project as the most important of those included in the 1968 Omnibus Bill. In addition, five of the nine navigation studies slated for completion were in Alaska. Ironically, it was Alaska that the

Division feared would be the hardest hit in the budget reductions.²⁵

With abrupt swings and uncertainties in funding, the new Division Engineer General Roy S. Kelley reevaluated the relationship of the Alaska District within the Corps. He urged the Chief's Office to authorize a new study of Alaska, stressing the importance of promoting the Corps' interests in the state: "I feel we should make every effort to establish a role for the Corps in Alaska which is commensurate with our responsibilities, interests and capabilities." Kelley even believed that Alaska could become a priority for the Corps in the coming years because of the oil discovery on the north slope of the Brooks Range. According to Kelley, a year before the discovery Alaska was considered "desolate and undevelopable." Now that thinking was "completely reversed." The talk in Alaska was of new cities, large harbors for super-tankers, multi-million dollar pipelines, permanent roads and railroads to Prudhoe Bay. This speculation rekindled the interest of the Alaskan Congressional delegation in river and harbor improvements, and already the District was studying Kenai and Anchorage harbors. Kelley hoped to obtain technical and financial assistance from the Chief's Office on sediment problems in Alaskan harbors to help in this planning. He urged the Chief's Office to outline a new role for the Alaska District in view of the sudden demands for transportation lines and facilities for the newly discovered oil. He also reported power shortages in Juneau and the delay in getting power on line at Snettisham. When the Chief allocated \$130,000 for engineering research on coastal projects for fiscal years 1970 through 1977, Kelley interpreted this as a means of assuring continued Corps leadership in Alaskan water resource development.²⁶

Over the next few months, the Administration announced a 75 percent reduction in federal construction funds. Greatly concerned, General Kelley sent a five-page letter to General Clarke outlining why the reductions would be more harmful in Alaska than in other districts. As he explained, Portland District had adjusted to a minimum construction program and enjoyed a continuing heavy workload in operations and maintenance as did the Seattle and Walla Walla Districts. However, the Alaska District faced an immediate and significant reduction in a workload that was of only moderate proportions to begin with. Moreover, Kelley feared construction cutbacks from the Army and Air Force. In view of these possibilities, he authorized an analysis of the Alaska District in the hope of determining the effects of the decreases on staff and programs. The study also sought to identify alternatives which would enable the District to "continue anything approaching a significant Corps of Engineers' contribution in the State." Genuinely alarmed, Kelley requested the Chief's Office to give the most serious consideration to taking some actions with utmost urgency.

Kelley based his request on the unique characteristics of the state - military, economic and geographic - and the special skills that staff members possessed. He gave as an example the welding engineer technician who was one of only two people in Alaska capable of teaching and inspecting the latest technology. The loss of these specialists, according to Kelley, would have a severe and long-ranging impact at a time when Alaska's overall growth potential appeared to be reaching its maximum. Another basis for the argument to exempt Alaska from the announced 75 percent reduction was Kelley's strong belief in the Corps' essential role in that state. To drastically cut back on the District's programs would be an abrogation of

responsibilities to the state and the nation and abandonment of a position of trust and ability to carry out a mission "in face of a future need perhaps greater than we have yet imagined." General Kelley contended that if the Corps "voluntarily" stepped aside, the engineering and construction void could not be filled successfully. All agencies in Alaska faced the continual problem of recruiting and keeping skilled workers. With the oil boom increasing the competition for these workers, it would take a new federal agency or a group of smaller agencies several years to build up comparable expertise. "It's too big a job, there is too little time, and the result would be mass ineffectiveness. This is not, in my opinion, serving public interest," he cautioned.

Kelley also believed in the tremendous future of Alaska, a future that would depend on a high level of planning and engineering capability. The District currently served as a consultant to the Atomic Energy Commission, the Alaska Railroad, the Alaska State Housing Authority, the U.S. Public Health Service, and the Office of Emergency Planning. Looking ahead, Kelley foresaw expansion of the Alaska Railroad, extension of an 800-mile pipeline system, and a major flood control project for Fairbanks. Furthermore, the 1964 earthquake and the 1967 Fairbanks flood proved to Kelley that the Corps was the only agency in the state capable of managing heavy workloads and emergencies.

The Division Engineer cited specific areas other than meeting emergencies where the District organization excelled: working under conditions where deadlines were commonplace and personnel expected to handle a variety of field and office assignments, and a greater mobility of employees. Without an adequate budget, the District faced transfer of its functions, closure, or a drastic reduction in staff. If the reduction occurred, Kelley advised the Chief's Office to accept the fact that Alaska would have an unusually high cost performance but that it must maintain a minimum but balanced force despite the Corps' general limitations on manpower.²⁷

Because of continued military construction and the Snettisham project, Alaska District was able to maintain its equilibrium over the next few years. It undertook plans for two other hydroelectric projects in the Cook Inlet area at Bradley Lake. In its 1960 preliminary study of Bradley Lake, the District concluded that anticipated deficits of power for the Cook Inlet area justified hydroelectric developments. Because of moderate costs, Bradley Lake was judged more feasible than other projects, particularly a plan that would use tidal power in the Cook Inlet and a dam on the Susitna River. The Board of Engineers, the Secretary of the Army, and the Alaska Senators all endorsed Bradley Lake, but the availability of alternative and cheaper power sources resulted in deferral. The Alaska District also investigated smaller hydropower projects in southeastern Alaska that would benefit the four communities of Sitka, Petersburg, Wrangell and Ketchikan.²⁸

A dam in the Susitna River Basin was seriously considered because of its proximity to the railbelt corridor from Anchorage to Fairbanks. The Alaska District's 1950 survey had foreseen a critical power shortage in the Anchorage area, but it recommended deferring hydropower studies. The Bureau of Reclamation conducted studies of power sites in the basin in 1948, 1952 and 1961. The last study recommended two dams and reservoirs in Devil Canyon. A later study in 1974 concluded that development in the upper Susitna Basin would have less environmental impact than projects in other basins, and that dams proposed for the Susitna River would



Devil Canyon in south central Alaska.

satisfy needs for firm hydroelectric power in the railbelt. The Alaska Power Administration and Kaiser Aluminum also issued reports on the suitability of Susitna for hydropower development. In the 1970s the Alaska District began its comprehensive studies of hydropower sites in the railbelt area, including six in Devil Canyon and three on the upper Susitna. At the beginning of the study, the District held public hearings and initiated an independent study of the recreational, environmental and aesthetic factors of the basin.²⁹

Reaction to the Susitna project was not unlike that at other projects proposed in the 1970s. The desires of many Alaskans to maintain the status quo of their rugged sparsely populated state increased the opposition to development. Critics challenged the District's draft environmental statement, protesting that it did not adequately assess alternative sources of power and projected power needs of the railbelt area. They questioned the need for the power from Susitna. They asked, if large industries were attracted to the railbelt area, would this development be desirable in social, economic and environmental terms? There would be problems of sedimentation and pollution of water below the dam, erosion, and unknown effects on wildlife. Furthermore, the dam site was located near

an earthquake fault. Other Alaskans were torn between the Alaska of the past with its pristine wilderness and their own growing reliance upon modern conveniences, like electricity. As one sourdough, the owner of a modern two story house on a homestead claim, explained at the 1975 hearing, "I've come a long way in 40 years out of that trapping cabin, and I'm pretty much oriented to electricity all the way around." Most participants at the hearing agreed with this view. A questionnaire found that of the 105 respondents 61 favored further planning, 12 were against, 16 undecided, and 16 had no opinion.³⁰

Guided by the 1969 environmental protection legislation, the 1975 Feasibility Study of the Upper Susitna River Basin addressed economic, social and environmental factors and the market assessments prepared by the Alaska Power Administration. Of three possible rates of growth proposed by the Power Administration, the District selected the mid-range as a realistic balancing of current energy consumption and growth with estimated future development and more efficient use of energy. Whereas arguments for developing Columbia River hydropower in the 1930s and 1940s and for Rampart Dam in the 1960s had been based on markets and industrial growth following the provision of cheap power, the 1975 Susitna report rejected this approach. It argued that it was inappropriate to predict future population and economic growth and then provide the energy to make it happen. By doing this, "the initial projections may become a self-fulfilling prophecy," and power would be used "as a tool to direct growth toward socially desirable goals" The report advised that in the absence of any such generally accepted growth goals, it seemed highly presumptuous to do anything other than plan to satisfy the energy needs for future development. The District had learned from the Rampart experience that only a portion of the tremendous hydropower resources of Alaskan rivers could be justified for development. District Engineer Colonel Christian Hanburger in writing about Rampart in 1961 had stated, "Ample low-cost power has and will continue to attract industry, business and people. Simply stated, power is wealth." Over ten years later, the Susitna report concluded that further study of the huge Rampart project was not warranted, that besides creating adverse environmental impact on fish and wildlife, the project would far exceed the "projected power needs of the railbelt area for several decades."³¹

The District's Susitna report did not consider preservation and maintenance of the 'Alaskan way-of life' in its analysis, although it commented that this factor could hinder residential and industrial growth. The report found other energy alternatives were too costly, harmful to the environment, or not technically practical. It concluded that the renewable water resources of the state had excellent potential to answer the energy needs of the railbelt, but it also found coal-powered plants at Fairbanks and Anchorage offered a viable alternative. Of the several power options studied, the report recommended three combinations of dams at Devil Canyon and Watana with alternative third dams at Denali or Vee.³²

The Susitna project continued to encounter obstacles. The Office of Management and Budget ordered another investigation, objecting to the 1976 revised report on the grounds it did not adequately cover seismic data and economic effects. Nonetheless, Congress conditionally approved construction and the District began additional studies on the foundation and reevaluated the economic features of the proposed dams at Devil Canyon and Watana. Before proceeding with site investigations, the Division worked out a

cooperative agreement with the Bureau of Land Management over environmental precautions and archaeological surveys. The first stage of negotiations began in January 1978 with a series of public meetings in Anchorage. After the hearings the two agencies agreed on 18 stipulations for the onsite work that included an archaeological survey, cooperation with the Fish and Wildlife Service in protecting endangered and threatened species, and minimizing the impact of machinery and crews on the ground. In order to ensure this last safeguard, crews were housed at Talkeetna and flown in to the work site, making it unnecessary to build temporary housing, and special vehicles with low pressure tires moved in after the ground was frozen. Other equipment was flown in and dropped by parachute. The work was completed in March 1978, and a supplemental report was submitted to the management and budget office in February 1979. This report increased the initial cost estimate from \$1.5 to \$2.3 billion.³³

A further complication for the project and the future of hydroelectric projects in Alaska appeared with legislation proposed in 1977 by Interior Secretary Cecil Andrus to declare much of Alaska a wilderness area. This action would withdraw land from private hands and designate the Susitna as a wild and scenic river. Congress eliminated the Susitna from the bill after Washington Representative Lloyd Meeds, Chairman of the House Water and Power Subcommittee, protested withdrawing the prime hydropower site in Alaska. He countered the arguments of recreationists and white water enthusiasts by noting that the Susitna was an ugly river in the stretch along the Devil Canyon and Watana dam sites. The Susitna project had other important supporters, including Alaska Governor Jay Hammel, Senators Walter Hickel and Mike Gravel, and Eric Yould, Executive Director of the Alaska Power Administration. Those who supported the project argued that hydropower was a clean and renewable resource and that the area would soon experience an energy shortage. Opponents contended that existing natural gas and coal-fired plants were cheaper and adequate to meet the anticipated energy needs of the railbelt. They also charged that Susitna, like the doomed Rampart project, would produce an amount of energy far exceeding known or projected markets. The Water Coalition Review, a group of national environmental organizations, listed the Susitna as one of the worst disasters in water development.³⁴

Officers of the Alaska District answered questions from the public at meetings like the one held at Talkeetna High School in February 1978. "There has been a lot of misconception about what's going on," Colonel George Robertson noted. During a slide presentation, Colonel James Fero, the Deputy District Engineer, explained that power demands were expected to double by 1985 and that precautions would be taken to prevent scarring the environment. Robertson also assured the audience that the District would not recommend the dam if there was the "slightest doubt" that it could not withstand an earthquake.³⁵

Under the Carter Administration's policy of not funding new water projects, state politicians and interested groups attempted to have dams investigated, designed and built with state sponsorship. The Hydroelectric Power Development Act of 1976 authorized the Corps to act as a contractor for a state in preliminary studies and construction of hydropower projects. Eager to participate in this state-federal arrangement, Alaska passed legislation authorizing the sale of \$8 million in state bonds to pay for the first phase of the work. Then, in early 1979 the Internal Revenue Service rejected the



Seward, and 4th Avenue in Anchorage after the 1964 earthquake.



financing plan, opposing the use of the \$8 million as collateral for borrowing more tax exempt money for the feasibility study. It would not allow the Alaska Power Administration to pay interest on the borrowed money to finance the study. Without the authority to issue tax exempt bonds, Eric Yould of the Power Administration believed it would not be possible for the state to finance the project by itself. At the beginning of the 1980s, Susitna remained unauthorized, although the state and the district continued detailed studies of smaller hydropower projects.³⁶

2. Alaska Earthquake and Flood: Meeting the Emergencies

The Corps' prominent role in Alaska was strengthened by the Alaska District's performance during two major disasters, the 1964 earthquake which had its epicenter near Valdez, and the 1967 flooding of Fairbanks. The earthquake occurred late Friday afternoon, March 27, with strong tremors radiating northward to the Kenai peninsula and Kodiak. After the first shock, tidal waves struck the coastline, tumbling buildings and opening fissures in the streets. Ports were swept by seismic sea waves, the tsunamis, which destroyed the industrial section of Anchorage and the waterfronts of Seward, Homer and Valdez which subsequently burned. At other harbors the tidal wave grounded fishing boats and destroyed channels. The earthquake created slides on highways, damaged bridges, and twisted the iron rails of the railroad between Anchorage and Seward. A temporary loss of radio service prevented authorities from discovering the extent of the damages for some time.

Because of Alaska's military installations, the state was better prepared to handle a disaster of this proportion than other states would have been. The federal Office of Emergency Planning immediately requested the Corps to assist in the emergency and restoration efforts. The District

established communications with the Anchorage headquarters of the Alaska Command and the Civil Defense. On Saturday the Army Engineers began assessing damages and repairing essential services, and it dispatched disaster teams to other cities on the Kenai peninsula. At Elmendorf Air Force Base, engineers prepared a preliminary damage estimate of \$20 million. Subsequently the District established three offices at Anchorage, Valdez and Seward to contract for clearing of rubble and emergency repairs, and the other three districts in the Division sent disaster teams. Division Engineer General Lapsley left immediately for Alaska, staying several weeks to help arrange relief. Several members of his staff also assisted for extended periods.³⁷

The speed and competency of the District in supervising clean-up, restoring services, and managing contracts were impressive. One private bonding company praised the District for its fine job: "It is a real pleasure to witness the efficiency being exercised under very trying circumstances . . ." The mayor of Anchorage, expressing what had been in the "minds and hearts" of the city, cited the tens of thousands of "dedicated man hours" of those going "far beyond the call of duty in guiding the clean-up and reconstruction program." He thanked the District for its efforts to assist the area to "rebound with unbelievable speed, and to instill a feeling of calm assurance that we are on the right path."³⁸

The second large disaster in Alaska was interwoven with the Corps' studies and plans for flood control works to protect Fairbanks. In 1937 the Seattle District Office began the largest flood control project in Alaska at the Tanana River and Chena Slough. A preliminary examination uncovered the potential danger to life and property at Fairbanks from floods caused by overflows of the Tanana River into the Chena Slough and then into the Chena River. Although actual flood damages in Fairbanks had been slight, in the late 1930s the situation gradually worsened as the Tanana River shifted its channel, forming new cutoffs into the Chena River through the slough. Besides threatening Fairbanks, the changes had the potential of disrupting trade and rail connections into the interior. On



Fairbanks Flood. Slater Dr. in the Island Homes residential area four days after the flood crested.



Looking downstream from the Cusham St. Bridge. Chena River was still high five days after the flood crested.

the advice of the Seattle District Engineer, Colonel Herbert J. Wild, Colonel Robins of the Division recommended an earth and rock dike to direct the overflow from the Tanana back to the original channel and to relocate part of the Richardson Highway. The total estimated cost was \$565,000, and the Board of Engineers and the Chief concurred in the recommendations. With Congressional approval, the Corps began constructing a rock dam on the right bank of the Tanana in 1940, completing it in 1944. The dam represented only a partial solution to the flood problem. A serious flood in May 1948 caused damages of almost half a million dollars, but Congress did not authorize additional work.³⁹

The growth of the Army Post at Ladd Field (now Fort Wainwright), and population expansion in the Fairbanks area increased interest in flood protection. The Division's 1951 interim report recommended a flood control project of over \$8.5 million, with the stipulation that local governments contribute money and land. Congress authorized the project in the Flood Control Act of 1958, but there were two major obstacles. Population had spread into the area planned for the project, doubling the potential flood damages, and the City of Fairbanks discovered that it did not have the authority to levy assessments outside the city limits. A more comprehensive solution was needed, and in 1965 the Senate Public Works Committee authorized the restudy, appropriating \$30,000. Alaska District recommended a combined development of a dam and reservoir on the main Chena River and a 19.5 mile levee. The levee would extend from the previously constructed dam along the Tanana River to the mouth of the Chena. Because this constituted a major departure from the 1958 project, the Chief's Office requested a new investigation.⁴⁰

In spring of 1967 the District scheduled hearings on two alternate sites for an expanded flood control project. The District favored the upstream site for the dam, but Fairbanks residents disagreed because it would inundate more scenic and valuable land than the downstream site. The delay of the hearing until September 19 – not announced until August 1 –

created additional anxiety. The District was also late in sending out the notice which arrived at some points a few days after a major and unexpected summer flood struck Fairbanks on August 14. The flood meant, among other things, a third rescheduling of the hearings to October 20. In the meantime, the District found itself heading a major flood fight and cleanup operation as well as facing charges of procrastination.⁴¹

Swollen by a record rainfall, the August floodwaters cut off Fairbanks from all outside communication and forced evacuation of the community of Nenana on the Tanana. In Fairbanks flood waters completely inundated the city, driving residents to rooftops and destroying or damaging every home and almost every business. The Fairbanks Area Engineer Office immediately mobilized for the flood fight. With the help of the military, helicopter crews rescued people from rooftops. Fifteen flood control specialists from the Division, and Division Engineer General Elmer P. Yates flew immediately to the city. President Johnson declared the area a major disaster and released funds for rehabilitation. The flood helped persuade Congress to pass a national flood insurance program, although it would not be retroactive to the Fairbanks disaster.⁴²

The flood and flood fight set the stage for considering the District's plans for a flood control project and warning system. Soon after the flood the District began constructing a minimal flood warning system for the Chena and lower Tanana River valleys consisting of six stream gauging stations and radio transmissions of data. The Division, the U.S. Weather Bureau, and the U.S. Geological Survey funded the stations which the Weather Bureau operated and maintained. The District improved its flood emergency system and established a flood control center at Anchorage. At the rescheduled October public meeting, almost all of the 150 participants expressed their support for the District's two-dam levee and flood control project – a large dam upstream on the Chena and a smaller one on the Little Chena. The North Fairbanks borough agreed to pay maintenance costs for the \$112 million project.



Chena project recreational area.



The Chena flood control project.

Congress authorized the project in 1968 although construction did not begin until ten years later.⁴³

In designing recreational facilities for the project, the District first planned a lake behind the dam, but the Alaska Department of Fish and Game objected to what they believed would become a swamp. The District then suggested creating a lake downstream in a basin formed by removing gravel for the construction. Other proposed recreational features included snowmobile and cross country ski trails and a golf course. Fairbanks and the District would share the costs of building campgrounds, picnic areas, boat ramps and beaches. The final project was single-purpose with a long earthen bank and a levee, the only recreational features being the two small lakes made from excavated and flooded gravel pits.⁴⁴

The Chena project represented modern concepts in dam design. Tom Munsey of the Alaska District explained that unlike the big water projects in the lower states that had provisions for water recreation, Chena would not have an impoundment. This would preserve the natural area and make fish passage facilities unnecessary. Consequently, the District would not have to worry about permafrost destabilizing the banks of a lake. Some believed that Chena could become a prototype for other proposed big dam projects now blocked by environmental concerns. Although the upstream dam was completed in 1980, the District deleted the proposed dam on the Little Chena as unnecessary.⁴⁵

3. New Energy Sources and Environmental Concerns

Although Alaska's sparse population limited the scope and size of its hydropower developments, the District became involved in other energy resources beginning in the late 1950s. One was nuclear energy. In 1956 the prominent nuclear physicist Edward Teller and scientists from the University of California and the Atomic Energy Commission (AEC) proposed using a nuclear blast to develop a harbor on the

northwestern coast. A major argument for making Alaska the site for this experimental peacetime use of nuclear power was the advantage of creating a deepwater port to aid in opening up the Arctic slope's mineral deposits. Teller pronounced Alaska a good location for the experiment because "Alaskans are known to be reasonable people." The scientists claimed that the blasts would not be harmful to people, although they would kill fish in the immediate area, and that the costs of creating the port in this way would be considerably less than with conventional equipment. Nuclear energy was also proposed for aiding in construction of a dam at Rampart or Susitna, a shipping canal on the Alaska Peninsula, and a harbor at Kateel.⁴⁶

The proposal to use nuclear explosions to develop resources resurfaced in 1958 with the support of Washington Senator Henry Jackson. Under this plan, known as Project Chariot, thermonuclear explosions would create a harbor at Cape Thompson, 250 miles south of Point Barrow, allowing access into undeveloped coal fields. Jackson described the project as a peaceful demonstration of atomic power. He believed that there existed an unequalled opportunity to carry out large atomic landscaping operations through a comparatively simple harbor and channel excavation project. Critics claimed that Project Chariot was, in fact, a cover-up for testing an atomic bomb in Alaska. Others charged that environmental studies of Cape Thompson by scientists, including Teller, were far from objective, but merely rubber-stamped the decisions of the Atomic Energy Commission. On the other hand, Alaskan newspapers strongly supported Project Chariot as a means of bringing in federal funds and furthering human progress.⁴⁷

Despite Teller's and Jackson's backing, the Atomic Energy Commission decided in 1962 not to use Alaska as a testing ground. One reason given for dropping the project was economic. Not enough use would be made of a harbor to warrant the expense. A more compelling one was the strong sentiment against nuclear explosions, despite Teller's belief in the "reasonable" attitude of Alaskans. In fact, the project

prompted one of the first general meetings of Alaskan Eskimos. Although nuclear explosions for excavation were never accepted nor used, the idea persisted into the late 1960s that Alaska was a suitable place for such experiments. The Corps-sponsored Nuclear Cratering Group asked the Division in 1968 to help in selecting sites for Project Plowshare, including one for improving navigation. A team of representatives from the Corps and the Nuclear Cratering Group toured Alaska as well as Portland and Seattle Districts. The team selected Serguis Narrows and the Kodiak small boat harbor for further considerations, but these plans for using nuclear explosions in construction were never implemented.⁴⁸

Military testing of nuclear devices also involved the District. In 1965 the District built support facilities for the tests at Amchitka in the outer Aleutian Islands. The Atomic Energy Commission declared the first blast in October 1965 highly successful and not destructive to wildlife. However, its plan to continue with underground testing in the Brooks range in 1966 met with firm opposition from the Alaska Federation of Natives. Consequently, the AEC decided to continue testing on Amchitka which was located hundreds of miles from human habitation. As with the first tests, the District again was asked to be the construction agency. By February 1967 the Division had received \$1.4 million to cover subsurface investigations and topographic surveys for camp and support facilities, plans and specifications for a 700-man portable camp, logistical support for the survey, and material for two warehouses and a dock. Highly pleased with the District's support of the tests, the AEC increased funds to \$2.65 million a few months later. The new Division Engineer General Elmer Yates reported that after an initial scramble to award contracts, the construction program was under control.⁴⁹

In the following months, the District expanded its activities at the Amchitka project by taking over direct supervision of construction from the AEC. Still, military construction funds remained uncertain for the long-range future. While General Yates expressed hope that the AEC would continue to give the Alaska District additional work, Seattle District, waiting for release of funds for the Sentinel project to place missile bases in the Seattle vicinity, was having difficulty surviving on the reduced military construction program. Like Alaska District, it faced losing staff and the ability to handle military construction programs when funds were once again released. "I hope we can get better planning information soon as to the role the Districts are to play and on what schedule," Yates commented to the Chief.⁵⁰

The AEC detonated the second Alaskan underground test explosion October 1969 amid growing environmental opposition. Additional tests were announced for 1971. Alaska District again improved and maintained test facilities, but this time well-organized groups, native organizations, federal, state and Canadian legislators vigorously protested. Nonetheless, the AEC carried out the third test on November 6, 1971 which created a lake 55 feet deep and one and one-half miles wide. Although the explosion did not create the earthquake or tidal wave many feared, it did damage wildlife populations. The AEC closely monitored the tests and spent \$1 million in restoring the site, but growing opposition which included Alaskans angered at not being consulted on the use of their state as a test site, deterred further tests on Amchitka.

Nuclear energy had first arrived in Alaska in the late 1950s but in a much quieter and non-explosive form. In 1957 the Army announced plans to build a small experimental atomic

power plant at Fort Greely, 60 miles south of Fairbanks. It intended the operation to prove the advantages of making military installations less dependent on fuel oil supply lines. The Alaska District supervised construction and turned the completed facilities over to the Army in 1961.⁵¹

The energy source that did transform Alaska and challenge the predominance of hydroelectric power in the Pacific Northwest was oil, the last energy resource to be exploited in Alaska. Oil has brought tremendous changes to Alaska and has involved the Division through the construction of pipelines for defense and industry. The Division has granted permits and protected wetlands along the path of the modern trans-Alaska pipeline stretching from Prudhoe Bay to Valdez. The discovery and use of oil and natural gas dates back to the early 1900s when oil wells were drilled near Cold Bay on the Alaska Peninsula and in the Katalla district east of Cordova. In 1911 a small refinery was built at Katalla, producing around 150,000 barrels until it burned in 1931. The existence of oil on Alaska's North Slope was reported early in the 19th century, but President Harding's designation in 1921 of 37,000 square miles as a naval reserve temporarily halted private development. Investigations by the U.S. Geological Survey and the Navy in the 1920s and later from 1944 to 1953 confirmed the existence of a major oil reserve, but no important studies were made at that time.⁵²

Interest in Alaska petroleum increased during World War II, and in 1944 President Roosevelt asked Congress for \$1.2 million for oil exploration and drilling in Wide Bay. Under an agreement between the Interior and War Departments, Interior would explore the area and the Corps would drill an exploratory well. The War Department justified the drilling on the grounds of heavy demands for petroleum in the Pacific war zone and on-going military operations. It also cited peacetime uses, such as the substantial benefit of making Alaska self-sufficient and the post-war need for oil in the Pacific areas.⁵³

Military buildup and operations in the Pacific generated three projects to move petrol from oil wells to refineries and transport centers. One of the most ambitious of these projects was CANOL (Canadian Oil) which began in May 1942 under the Corps' direction. The plan involved expanding a small oil field used by mining operations at Norman Wells which is on the McKenzie River in Canada's Yukon Territory. From there, oil would be transported through a pipeline to Whitehorse on the Alaska Highway where a small refinery would be flown in and reassembled. Although there was considerable skepticism about completing the pipeline in a year's time, gas flowed from CANOL 2, Skagway to Whitehorse in summer 1943. In April 1944 oil flowed directly from Norman Wells to Whitehorse, and another line ran from Whitehorse to Fairbanks. Except for the segment from Skagway to Whitehorse, these lines were shut down in April 1945 when the Japanese threat in the Pacific was subdued. The Skagway-Whitehorse line was subsequently leased to the White Pass and Yukon Railway for transporting diesel oil, but the line from Norman Wells to Whitehorse was dismantled and sold.⁵⁴

Although the end of the war terminated the emergency nature of pipeline construction, Congress remained interested in using pipelines to supplement other transportation carriers. In 1948 the House Committee on Interstate and Foreign Commerce investigated the status of pipelines in Alaska. Because of the post-war expansion of military facilities in the Fairbanks area, the Committee suggested that it might be

desirable to rehabilitate the CANOL line from Whitehorse to Skagway or Haines to allow a northward flow of oil to these bases. Because the demand for petroleum products would outstrip the capacity of the CANOL line, a larger pipeline was necessary. The Committee advised that a reconstructed and expanded line would reduce railroad traffic as well as the substantial revenues from the oil rail shipments. At the end of the war the Army transferred the CANOL system to the Corps which put it under the Alaska District's charge.

The war also accelerated interest in the Northern Slope oil reserves. In 1943 experts began discussing how best to transport the oil from the Arctic to all-season shipping harbors in southeastern Alaska. The National Resources Planning Board Field Office in Portland reported that the extensive pools of oil on the Arctic slope were within easy reach of a drill and without too great a burden of overlying rock. The most serious obstacle to further exploration and rapid development was the isolation of the oil fields. The Portland Planning Board advised construction of an oil pipeline over the Brooks Range connecting with the proposed Dunbar-Teller railroad.⁵⁵

Although work on the trans-Alaska pipeline would wait until the 1968 oil strike on Prudhoe Bay, the District completed another pipeline based on the success of the CANOL line in inexpensively transporting large quantities of petroleum. The new pipeline system from Haines to Fairbanks, known as ALCANGO (the Alaska-Canada Gas Oil Pipeline) had a much larger capacity than the wartime one. When completed in 1955 it could transport approximately 10,000 barrels of oil each day. The points along the 600-mile line were linked by telephone and the Alaska Communications System. In 1962, the District doubled the system by adding six more pumping stations, an effort which involved building several small towns.⁵⁶

The pipeline from Haines to Fairbanks and the shorter one from Anchorage Bay to Fort Richardson moved oil from tankers into Alaska. In the late 1950s oil began moving out after the Atlantic Richfield Oil Company made an important discovery at Swanson River on the Kenai Peninsula. At the end of the 1960s, fourteen fields on the Peninsula and offshore Cook Inlet were producing oil and natural gas. In 1966 these resources accounted for almost 60 percent of Alaska's mineral production and were producing \$9 million in revenue for the state. This success spurred exploration and drilling throughout Alaska. Fortunately, the fears of conservation groups that these activities would harm the Kenai Moose range proved unfounded. The moose and the oil wells proved compatible, giving pro-development forces a powerful argument for later development projects.⁵⁷

The discovery of oil fields near Alaska's population center coincided with discussions of its economic future. Heavily dependent on military spending, Alaska needed a stable industrial base and more products for export. The Alaska District knew full well the uncertainties of depending on defense spending. During an address on the Corps' military construction program, District Engineer Colonel Hanburger urged the development of Alaskan resources as a means of insuring the state's economic independence. "I think that Alaska's future depends on the development of its resources," he stated. "If this is not done, then I do not know how it will continue to grow. My advice is to develop them as rapidly as possible. This job is much larger than any which has been performed in the past."⁵⁸

The issue of Alaska's economic self-sufficiency and the need to develop its resources affected the Corps' planning for the two hydroelectric projects at Rampart and Bradley Lake. Although hydropower could help industrialize the state, unlike oil it is not an energy product that can easily be transported great distances. Interior Alaska, which Rampart power would have served, did not have the markets to absorb and pay for the power. On the other hand, although Bradley Lake was located in the Anchorage marketing area, oil and gas reserves on the Kenai Peninsula-Cook Inlet area provided an equally convenient source of energy and would keep development in the private sector. Despite Alaska's magnificent hydropower potential, by 1980 the District had completed only one project at Snettisham. The Anchorage to Whittier pipeline, originally built to supply fuel to military aircraft en route to southeast Asia during the Vietnam conflict, continued to transport oil.⁵⁹

It was petroleum that would dominate Alaska energy and resource development. In January 1968 Atlantic Richfield made its momentous strike at Prudhoe Bay, which eclipsed all other oil discoveries in Alaska and set off a boom that dwarfed the Klondike and Nome gold rushes. The Corps served as a technical adviser during this period and issued permits for building the pipeline over waterways. Through its authority to issue permits and its technical expertise in Arctic construction, Alaska District played a key role.

In the scramble for leases that followed the oil discovery, a battle took shape between oil companies and environmentalists. The issue of economic development versus environmental protection was complicated by Alaska's long history of dependence on the Federal Government and administration by non-Alaskans who were often ignorant of, or insensitive to, the special problems of the state. The wealth of minerals, oil, natural gas, fish, and wildlife represented an opportunity for Alaskans to shed their dependency on federal subsidies. Some experts warned that the exploitation of these resources, primarily the Arctic off-shore oil fields, would not bring lasting prosperity to the state. Almost everyone admitted that the oil revenues would help place Alaska on a more comparable level with other states financially and in providing adequate services to its residents.⁶⁰

Many Alaskans wished to have the best of two worlds. At public conferences organized by the Brookings Institute in 1969, one group stated that what they sought was a unique Alaskan lifestyle "that affords the conveniences of technological innovation . . . with the opportunity and values of living as close to nature as possible." The institute cautioned that whether or not that would be possible would depend on a careful analysis of engineering technology and design in view of the fragile and harsh environment of the Arctic Slope. Native Alaskans had the largest stake in how the area was to be developed. In preparing the environmental impact statements, the District would have to establish and maintain good relations with the people who lived in the most northern part of the United States.⁶¹

Anticipating the work and problems ahead, Alaska District Engineer Colonel Amos C. Mathews began his tenure in July 1970 by emphasizing the Corps' attitude toward environmental protection. Commenting on the 1969 National Environmental Protection Act, Mathews emphasized, "As public engineers we're not interested in just ramming something through." He also explained that the Corps, like other federal agencies, was "caught in the implementing stage" of the new act and was not sure of the act's full implications.⁶²

As a first step in granting permits for the pipeline company Alyeska to cross federal land, the Department of Interior prepared a draft environmental impact statement which the Chief's Office forwarded to the Alaska District for comment. Alaska District, North Pacific Division, and the Alaska Command prepared a joint statement which they sent to the Chief in February 1971. In forwarding this statement, the District remarked that because of the limited time available, this did not constitute a comprehensive review.

The statement stressed that an environmental impact statement (EIS) should be able to withstand legal challenges. It should be an "active, objective inquiry into the environmental effects of proposed federal projects, and bona fide consideration of these effects in making basic decisions at every stage of project planning." Further, an EIS on the pipeline should re-emphasize that no construction would be permitted until all design features were acceptable to the responsible agencies. The statement contended the draft EIS did not adequately address the possibilities of oil spills in Prince William Sound that would damage the valuable fishery or the environmental effect of constructing the terminal at Valdez. The floating booms and skimming devices cited as protection against oil spills were not totally effective and complete recovery of the oil was not likely. Although the Interior Department could issue a permit for the pipeline, the statement warned that this would not guarantee that the Corps would issue its own permits under the authority of the 1899 Rivers and Harbors Act. "This should be made clear to the Interior Department, Alyeska Pipeline, and the public to avoid a possible impasse for which the Corps would be severely criticized." It suggested that the Interior's EIS contain a detailed discussion of the terminal.

Alaska District was also concerned that no stipulations had been made to alert Alyeska to the pipeline's potential impact on crossing streams and rivers identified as navigable. There was also the question of future development of dams and reservoirs at pipeline crossings. In order to avoid possible disputes and future litigations, the District recommended that Alyeska be obligated to sustain the costs of relocating or modifying the pipeline. It contended that the public should not be required to bear the expense on pipeline alterations on public lands.

There were other, non-engineering considerations such as economic and social changes. The District suggested that the impact statement not limit itself to the labor force working on the pipeline, but also consider population growth and its effects on Anchorage, Fairbanks and Valdez, the latter town facing a transformation from a fishing village to a major industrial port.⁶³

The pipeline issue made good press copy. When columnist Jack Anderson of the *Washington Post* obtained a preview of the District's comments, he announced the Corps was suppressing the information because of Alaska District's unfavorable conclusions. Further news reports implied that the Alaska District was against the pipeline and ready to deny a permit for the Valdez port. While members of the review team explained to the press that their remarks had been made to insure that the EIS would meet all legal requirements, the headlines of the Anchorage *Daily Times* proclaimed, "Engineers Hit Pipeline, Corps Says It May Kill Permit for Gulf Work."⁶⁴

While press stories circulated in Alaska and nationwide, the Corps and the Interior Department began negotiations to

coordinate the pipeline permits. Up to that time the District had provided the Bureau of Land Management and Alyeska with technical assistance on Arctic construction, and since February 1969 it had been represented on the Department's Technical Advisory Groups. The Interior Department, which heretofore had exercised almost exclusive surveillance over the trans-Alaska pipeline work, in March 1971 requested the District's assistance in monitoring some of the controversial phases of construction and in reviewing the engineering plans. First it was necessary to reach an inter-agency agreement. Anticipating intense activity on the project, the Division in August urged the Chief's Office to finalize arrangements. General Sawyer wanted a memorandum of understanding that would define Alaska District's scope of work. Under the final agreement the District worked under the direction of the Interior Department, an arrangement the press construed as the Army Engineers encroaching on the Department's responsibilities. Meetings continued into November as the two agencies discussed how personnel from the two organizations would supervise construction in the field.⁶⁵

The pipeline construction coincided with environmental regulations and responsibilities. Like other districts within the North Pacific Division, Alaska District was struggling to prepare environmental impact statements on all new projects and on many older ones. As the staff attempted to expedite environmental statements in order not to delay project starts, the District complained it was spending too much time on the EIS and not enough on working environmental considerations into the planning, design and construction of projects. The request of U.S. Army in Alaska for environmental statements on all military construction considerably increased the workload. In addition, the District was responsible for preparing statements on 35,000 miles of coastline before it could issue permits for off-shore drilling structures. Although the process of completing the EISs was requiring considerably more time and money than originally estimated, the District was pleased with the results. It remarked that the public accepted its reports as objective and reliable estimates.⁶⁶

The larger work lay ahead with permits needed for the Alyeska pipeline crossings along the 789-mile route that straddles the 3,500 foot pass over the Brooks Range. The prolonged debates and court actions to delay or stop the project were abruptly interrupted by the oil crisis of the early 1970s. Facing a shortage of mideast oil, the Nixon Administration in 1973 announced its commitment to a new domestic energy program of self-sufficiency. The key was Alaska oil. President Nixon ordered the Interior Department to lease ten million acres along the continental shelf, including three million acres in the Gulf of Alaska, although this was subsequently reduced to 1.8 million acres. With Congress and the American public anxious over short supplies and high prices for heating oil and gasoline, Nixon obtained Congressional approval of the trans-Alaska pipeline permit, signing the pipeline bill on November 16, 1973. With this step accomplished, other federal and state agencies prepared to issue their own permits. The Corps' specific responsibilities were restricted to permits for navigational aspects of the pipeline. Under the inter-agency agreement, the Corps reviewed designs only upon request by the Interior Department, the Department was responsible for all design review, construction, inspection, operation and maintenance of the pipeline.⁶⁷

In September of that year an inspection team of representatives from the District, the Chief's Office and the U.S. Coast Guard made a 800-mile reconnaissance of

navigable waters the pipeline would cross from Prudhoe Bay to Valdez. They recommended 38 streams be classified as navigable. The District's counsel concurred with the recommendation, but the Chief of Engineers requested further investigations before it would make a finding. The District's two main concerns were first, structural and material, and second, protecting navigable waters for possible future projects. Two specific projects in the path of the pipeline were the Chena Lakes flood control project and the proposed Rampart Dam. In December 1973 with the first contract for Chena awarded, Alaska District Engineer Colonel Charles A. Debelius warned the Chief's Office there was no legally enforceable protection for the pipeline crossing at Moose Creek Dam on the Chena Slough, 25 miles east of Fairbanks. In 1971 the District had asked the Chief to include this stipulation in the Interior Department's permit to Alyeska. The North Pacific Division also favored including a provision to protect future civil works projects, namely flood control for Fairbanks and hydroelectric projects on the Yukon. It suggested that as a condition of issuing the permit, Alyeska be required to make and fund any modification or relocation of the pipeline affecting future projects determined to be in the public interest. Although Alaska District was working with Alyeska on informally resolving the Moose Creek problem, the Division considered a written agreement an essential requirement. On the advice of its counsels, the Chief's Office decided it would be objectionable to hold Alyeska liable for relocating the pipeline to accommodate future projects.⁶⁹

The District was also concerned with the engineering aspects of the pipeline project. It worried that construction would begin before adequate designs and tests were completed. The Division concurred that these conditions should be met before construction proceeded, adding that pumping should not be permitted to start until an acceptable method of controlling oil spills was found. Further, if Rampart Dam was ever built, the reservoir would cover the pipeline at considerable depths in some places. Both the Corps and Alaska Senator Stevens had overlooked this contingency in 1973 when they made an inspection of the pipeline route.⁶⁹

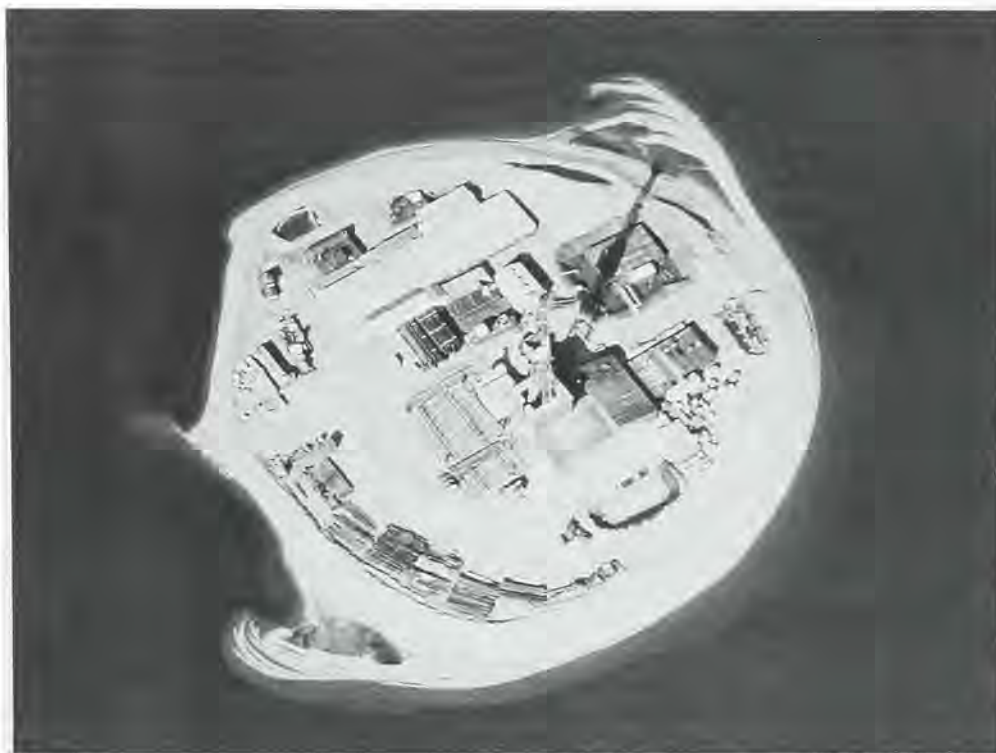
The District's anxiety over the pipeline's ability to withstand stresses and meet earthquake criteria prompted reviews at the Division and the Chief's Office. Little could be resolved as the Corps' legal authority was restricted to the pipeline's navigational aspects. The Chief's Office did request the navigability reports be substantially improved. Still, the overriding issue was the domestic oil crises. Then Director of Civil Works General John W. Morris meeting with Alaska District officers in December 1973 stressed that permits for the crossings would have to be expedited. Instead of waiting to issue one permit for all streams, Morris directed that single permits covering a series of stream crossings be issued by construction segment. He insisted that the Corps' internal procedures and administrative processes not impede the process. With the Administration, Congress and the public strongly supporting the pipeline, General Morris reminded the meeting participants that the "marching orders" were "GREEN - GO." Consequently, the Chief's counsel revised the standard permit form, instructing Alaska District to add special conditions after receiving comments generated by the public notice on the crossings. Alyeska approved the revised procedures for the permits and worked with the District on permit applications and the pipeline crossing at Moose Creek Dam on the Chena project. The Chief's Office also authorized the District to issue the permits without review by the Division

or the Chief's Office and after the Interior Department approved all safety and design aspects of the stream crossings. Morris also reminded the Secretary of the Interior that the Corps' responsibilities were limited to the navigational aspects.⁷⁰

In late 1973, the Division estimated that permits for the 38 crossings would require four personnel slots and \$100,000 for the remainder of fiscal year 1974. The Chief's Office increased this figure to \$150,000 in order to expedite the process, asking the Senate Appropriations Committee to release the additional funds. In the meantime, the Division advised Alaska District to proceed with the permits and not wait to receive the funds. Another serious staffing problem emerged as the pipeline construction escalated wages on the North Slope. In January 1974 Division Engineer General McConnell warned Chief of Engineers Lt. General William C. Gribble that Alyeska would adversely affect the Division's design and construction program in Alaska: "Already our staff is suffering from proselytizing by other agencies. Competition will also be keen in seeking A-E [architectural-engineering] assistance as they find the pipeline challenge more attractive." McConnell anticipated the greatest impacts would be in construction costs and scarcity of materials for the Division's other projects. He noted that interest in jobs in the Alaska District - small by comparison with the Alyeska operation - would also decline. McConnell's fears materialized by April as the Division attempted "to function in the shadow of a burgeoning pipeline effort." Bids on a large Air Force project were considerably higher than the estimates, and the Division learned that Alyeska had contracted for the shipping assets of the firm that usually supplied the remote Air Force project sites.⁷¹

While wrestling with the problems of permits and staffing, the Alaska District contracted for a special study of the Alaskan coast. The 1974 report, "The Alaskan Arctic Coast: A Background Study of Available Knowledge," examined the arctic environment and the potential effects of oil exploration, development and production. The District used these studies for subsequent environmental impact statements on offshore oil and gas development, including the Cook Inlet. In late 1974 the District processed six oil permits in this area, and then, as the trans-Alaska pipeline operations began to wind down in 1977, the District continued its environmental work. In one of these studies it identified Alaskan wetlands around Anchorage and other populated areas along the coast, because there was increased interest in developing these inland shorelines and rivers in the southeast and the interior.⁷²

The study and classification of wetlands alarmed those who feared this would prevent commercial and residential development. In March 1978 the city of Kenai vigorously protested the District's study plan which it claimed would lock up 30 percent of land in the city limits and 10 to 12 percent in the nearby town of Soldotna. The District had intended the study as a means of protecting the Kenai River wildlife habitat and recreation from uncontrolled development, but the Kenai Chamber of Commerce, in the midst of a building boom, charged that the report had overlooked another major species, man. Citizens at a public meeting protested the government's dictating what they could and could not do, pointing to the prominent federal role in their state's history. Other property owners asked the District to determine if their land was subject to Corps regulations. When the District released the review of the Kenai River in 1978, it simultaneously lifted a two-year moratorium on processing permits for construction along the



Offshore Duck Island exploratory drill pad on the Arctic Slope.

river. Since then the report has served as a guide for issuing permits and developments in the Kenai area.⁷³

Alaska oil and the Corps' permit program involved the Alaska District with yet another important constituency, Alaskan natives. Like other native Americans in the Pacific Northwest, organizations of Alaskan Indians and Eskimos participated in public meetings, seeking to protect their traditional way of life from encroachments. Their situation was particularly complex on the Arctic North Slope because of the extensive oil drillings, roads and the pipeline. For example, in November 1978 the native villages of Kaktovik and Nuiqsut and the city of Barrow filed suit against Exxon, the Corps of Engineers, and the Alaska Department of Natural Resources. The 2,630 plaintiffs sought to stop operation of an oil well in the Beaufort Sea near Duck Island, charging that the well and the artificial gravel pad would seriously endanger their subsistence economy. They claimed that the permit for the island was improperly issued and that no environmental impact statement had been prepared. The noise and water pollution, they contended, threatened to alter the migration pattern of the bowhead whale and reduce the numbers of Arctic char and whitefish.⁷⁴

Two years later the District attempted to work more closely with Arctic residents in preparing its environmental impact statements for a waterflood project at Prudhoe Bay. The project would inject water into oil wells, causing the oil to rise to the surface where it could be recovered. As the agency responsible for issuing the permits, the District's report included ecological factors peculiar to the Eskimos' lifestyle in its analysis of economic factors. The EIS noted the migratory patterns of wildlife – fish, birds, waterfowl, caribou and whale – that form the resource base for native villages. It pointed out that these species and the ecosystem they represent are linked to the Eskimo both culturally and by diet, a relationship recent technological change and organization of native groups into

political and economic units had not altered. Balancing these social and ecological concerns was the potential recovery of one billion barrels of domestic oil. Experts estimated the value from \$10 to \$27 billion that would accrue to the federal and Alaska governments. The North Slope Borough would receive \$20 million in property taxes. After weighing the benefits and adverse effects, the District issued the permits and the project was subsequently constructed.⁷⁵

There was no easy answer to this or other proposals for oil and gas development in Alaska. The Prudhoe project did bring the District to a better understanding and communications with Alaska native groups. The EIS examined the natives' special relationship with the land and the complex ecological balance, particularly in the arctic regions of permafrost and wildlife migrations. On a practical level, it found it had to allow adequate time for distributing notices and EIS drafts because of transportation problems and great distances between Anchorage and the North Slope.

The District also learned the importance of including native groups in its planning processes. A member of the Alaska Legal Services Corporation who had worked extensively with the villages of Kaktovik and Nuiqsut during the development of the Beaufort Sea oil wells complimented the District on coming to Barrow for the hearing: "I think these hearings are notable in that you as the decision-makers have personally come to hear the testimonies . . . I think it's very beneficial for the education of both the decision-makers and of the people here that the actual people that are doing the business come and see the people, see the communities, and take that into their account in addition to the written testimonies and oral comments." However, the Mayor of Barrow chastized the District representatives for not including an interpreter. At the end of the July 1980 hearings, Alaska District Engineer Colonel Lee R. Nunn candidly remarked, "It seems plain that we're going to have to spend a little bit more



Manning Point on the north slope, before the cleanup.



The village of Kaktovik on Manning Pt., 1984 before the cleanup.



After the cleanup.

money and time coming up here and talking to the people of the North Slope. I'm getting the message loud and clear that whatever we've done, it has not been satisfactory. I appreciate your remarks."⁷⁶

Alaska's military legacy contributed to the District's environmental responsibilities. In the late 1970s the District began planning for a large cleanup of military debris from World War II on the Aleutian Islands and the lower Alaska Peninsula. The objective was to restore the environment within practical restraints, and the District analyzed the effect of removing the debris on soil, water, wildlife, human and historic resources. The military had abandoned most of the military installations on the Aleutians and the Alaska Peninsula in 1950, leaving behind vast quantities of materials which were an eyesore and a safety hazard to the residents. Because of the harsh climate decomposition was slow, and without a cleanup effort most of the debris was expected to last another 30 years. In 1974 and 1975 Congress authorized the Corps to make a detailed study of the debris and abandoned buildings on nearly 30 sites and then prepare recommendations and cost estimates. A major criterion was judging if cleanup operations would cause environmental damage equal to or greater than the existing damage. The District proposed three alternatives. The first was a total cleanup that would remove 90 percent of the debris. The second would be a minimum effort concentrating on safety hazards, pollution sources, some wooden structures and collapsing metal buildings, and disposal of easily retrieved debris. A third was taking no action. The final report recommended two plans to minimize damage to the physical and biotic communities by leaving in place anything requiring removal by heavy machinery. It also advised using native labor, land disposal sites, and teams of qualified experts including wildlife scientists and archaeologists to inspect and supervise the operations. In addition, it proposed that Attu and Kiska be included in the National

Register of Historic Places national battlefields. In that event, structures and some military materials would be preserved on site and other articles salvaged for museums. In this instance, the extremely slow rate of decomposition would prove an asset to historians. As part of its investigation the District compiled a list of downed aircraft, indicating the position and condition of each. It also determined that an EIS would be required in view of the anticipated public controversy and conflicting interests arising from native claims to Alaskan lands.⁷⁷

The Draft EIS completed in September 1979 substantiated the 1977 report. It provided a modern example of the Alaska District's sensitivity toward the environment and its cooperation with native groups. The statement recognized that decisions to remove structures should not be made without the consent of local residents or authorities who might wish to continue using World War II buildings and runways. In particular, the wooden parts of the buildings constituted important materials in this treeless region. Furthermore, the District saw great value in employing native residents in the operations. Moreover the native people were more familiar with hazards than outside workers. "Finally," the report emphasized, "the Aleuts themselves have an important cultural stake in the past and future of the project area and deserve a major role in any project which would significantly alter its environment." By 1980 no final decision had yet been made on the alternatives with their trade-offs on environmental, historic and human benefits.⁷⁸

CHAPTER 15. ENDNOTES

1. Talk by Col. Farrell at panel on transportation and communications in Alaska, 12 Nov. 1954, Alaska District, RHA, IHF, "1953-54."
2. News release on Yukon Power, 20 Sept. 1955, Alaska District, RHA, IHF, 228-10; "Navigation of the Inland Waterways of Alaska," ca 1956, Alaska District, RHA, IHF, Box L-8-B-I.
3. Kieffer, speech of 1 Aug. 1957, *ibid.*
4. "Hydropower from the Yukon River," *Western Construction*, 34:5 (May 1959).
5. Remarks, George Sundborg, Assistant to Gruening, "What Next for Rampart?," 7 Sept. 1963, Alaska District, RHA, IHF, Box L-8-B-II.
6. News release, "Rampart Canyon Advisory Board," 2 Feb. 1961, *ibid.*, Box L-8-B-I.
7. News release, "Rampart Explorations Started," 1 March 1961, *ibid.* Details of this preliminary exploratory work are also in "Deep Freeze at Rampart Canyon," *Pacific Builder and Engineer*, May 1961, pp. 88-89, and Gus Norwood, "Wings Over the Yukon," *The Pacific Power Bulletin*, 15:7 (July 1961), pp. 4-7.
8. U.S. Congress, Senate Committee on Public Works, "The Market for Rampart Power," 87th Cong., 2nd sess., 1962, pp. 6, 15-16.
9. Remarks of Daniel W. Nordhill, NPD, 27 Sept. 1968, NPD, RHA, "Executive Office Files"; U.S. Congress, House Document 40, "Plan of Development for the Proposed Crater-Long Lakes Division, Snettisham Project, Alaska," 87th Cong., 1st sess., Jan. 1961; U.S. Congress, Senate Report No. 1786, "The Snettisham Project, Alaska," 87th Cong., 2nd sess., 25 July 1962, p.2.
10. Fairbanks *Daily News-Miner*, 22 and 27 March and 5 April 1963; U.S. Department of Interior, "Rampart Canyon Dam and Reservoir Project." 1964, quoted in Jacobs, *History of the Alaska District*, p. 97; Statement of Fish and Wildlife Service, 17 May 1962 in House Document 218, p. 213.
11. Fairbanks *Daily News-Miner*, 9 and 15 May, 10 June 1963; Alan Cooke, "The Rampart Dam Proposal for Yukon River," *Polar Record*, 12:78, p. 279.
12. Sundborg, "What Next for Rampart?"
13. Cooke, "The Rampart Dam Proposal," p. 278; Fairbanks *Daily News-Miner*, 21 Oct. 1964.
14. Anchorage *Tundra Times*, 26 Oct. 1964; Memphis *Commercial Appeal*, 6 Dec. 1964.
15. Alaska District, "Rampart Canyon Dam and Reservoir and Fairbanks Flood Control Project," District Engineers Conference, NPD, June 1966, copy in Alaska District Library; Hyzer to Cassidy, 29 April 1966, NPD Quarterly Reports.
16. Anchorage *Daily News*, 23 Feb. and 21 March 1967.
17. *Ibid.*, 2 Oct. 1967.
18. McConnell to Gribble, 25 Jan. 1976, NPD Quarterly Reports.
19. U.S. Congress, House Document 40, 87th Cong., 1st sess., 1961; Senate Report 1786, 87th Cong., 2nd sess., 1962.
20. L. William Kehe, "Progress at Snettisham," *Military Engineer*, 64:420 (July-Aug. 1972), pp. 256-57; Henry P. Lang, "Special Features at Snettisham," *Military Engineer*, 66:432 (July-Aug. 1974), pp. 238-39; Lyman L. Woodman, "Snettisham Challenges the Alaskan Winter," *Water Spectrum*, Spring-Summer 1976, pp. 16-22; Jacobs, *History of the Alaska District*, pp. 117-21.
21. Hyzer to Cassidy, 2 Feb. 1966, NPD Quarterly Reports.
22. Hyzer to Cassidy, 29 April 1966 and 1 Feb. 1967; Yates to Cassidy, 1 May and 2 Aug. 1967, *ibid.*
23. Federal Power Commission, *Alaska Power Survey* (Washington, D.C.: Government Printing Office, 1969), pp. 1, 49, 59-61.
24. Yates to Cassidy, 3 Feb. 1968, NPD Quarterly Reports; U.S. Congress, *Public Works Appropriations for 1969 for Water and Power Resources Development and the Army Corps of Engineers*, House hearings before a Sub-Committee of the Committee on Appropriations, Part I, Civil Functions, Department of the Army, 90th Cong., 2nd sess., March 1968, pp. 365-66, 382-83.
25. Daniel W. Nordhill, "Remarks for Briefing of Robert E. Jordan," 27 Sept. 1968, NPD, RHA, "Executive Office Files."
26. Kelley to Cassidy, 2 May 1969; Kelley to Clarke, 1 Aug. 1969, NPD Quarterly Reports.
27. Kelley to Clarke, 6 Oct., 1969, *ibid.*
28. Alaska District, *Review of Interim Report No. 2, Cook Inlet and Tributaries, and Part I, Hydroelectric Power, Bradley Lake Project*, 1 June 1960, pp. 25-27, 46; Jacobs, pp. 121-22; *Water Resources Development in Alaska 1981* (Portland: U.S. Army Corps of Engineers, North Pacific Division, 1981), p. 46.

29. Jacobs, *History of the Alaska District*, pp. 123–24. Reports also summarized in *Southcentral Railbelt Area, Alaska, Upper Susitna River Basin, Interim Feasibility Report* (Anchorage: U.S. Army Corps of Engineers, Alaska District, 1975), pp. 3–5; Transcripts of public meetings in Sitka, Petersburg, Wrangell, Ketchikan, 24, 26 and 28 March 1975, in Alaska District, “Rivers and Harbors in Alaska, Southeastern Alaska Hydroelectric Power Study,” pp. 1–6.
30. Alaska District, Transcript of Public meeting, “Upper Susitna River Basin, South-Central Railbelt Area, Alaska, Hydroelectric Power Study,” 7 Oct. 1975, copy in Alaska District Library.
31. Hanburger’s remarks are in his article, “Hydroelectric Power for Alaska,” *Military Engineer*, Nov.–Dec. 1961, pp. 449–51.
32. *Southcentral Railbelt Area*, pp. 44–46, 48, 56, 59–61.
33. Weldon Opp and Allan Wylie, “Susitna Survey: Concern for the Land,” *Water Spectrum*, 11:4 (Fall 1979), pp. 44–50.
34. Fairbanks *Daily News-Miner*, 6 April 1978.
35. Matanuska-Susitna Valley *Frontiersman*, 16 Feb. 1978.
36. Anchorage *Daily News*, 13 March 1979; *Water Resources Development in Alaska*, pp. 46–47.
37. Kenneth J. Sawyer, “Effects, Reaction and Recovery,” *Military Engineer*, 56:372 (July–Aug. 1964), pp. 246–49.
38. William C. Nelson, Dawson and Co., Seattle, to Alaska District, 18 Aug. 1964; Mayor George Sharrock to Sawyer, 6 Aug. 1964, in Alaska District, RHA, IHF, Box L-8-B-II. For details on the earthquake and the Corps’ response, see Alaska District, Alaska Good Friday Earthquake, 27 March 1964, After Action Report (Anchorage: U.S. Army Corps of Engineers, Alaska District, 1968).
39. U.S. Congress, House Document 561, “Tanana River and Chena Slough, Alaska,” 75th Cong., 3rd sess., 1938.
40. Alaska District, “Rampart Canyon Dam and Reservoir and Fairbanks Flood Control Project,” District Engineers Conference, NPD, June 1966. Jacobs, *History of the Alaska District*, pp. 114–15.
41. Col. Clare F. Farley, Alaska District Engineer to David Galloway, Editor, Fairbanks *Daily News-Miner*, 12 April 1967; *Daily News-Miner*, 17 July 1967; Alaska District, “Notice of Public hearing on Flood Control Improvements for Fairbanks, Alaska,” 1 Aug. 1967, Alaska District, RHA, IHF, Box L-8-C-V; Ketchikan *Daily News*, 18 Aug. 1967.
42. Anchorage *Daily Times*, 16 Sept. 1967.
43. Anchorage *Daily News*, 21 Oct. 1967; Kelley to Clarke, 2 Feb. 1971, NPD Quarterly Reports.
44. Fairbanks *Daily News-Miner*, 8 Dec. 1973.
45. Munsey’s statement in Virginia McKenney, “Final Push Begins on Chena Flood Control Project,” *Alaska Industry*, April 1978.
46. *Jessen’s Weekly* in the Fairbanks *Daily News-Miner*, 17 July 1956.
47. William R. Hunt, *Alaska: A Bicentennial History* (New York: W.W. Norton and Co., Inc., 1976), pp. 135–39.
48. Fairbanks *Daily News-Miner*, 29 Oct. 1958; Anchorage *Daily News*, 18 Feb. 1959; Jacobs, *History of the Alaska District*, p. 47; Hunt, *Alaska*, pp. 139, 140; Kelley to Clarke, 31 Oct. 1969, NPD Quarterly Reports.
49. Yates to Cassidy, 1 May 1967, NPD Quarterly Reports.
50. Yates to Cassidy, 3 Feb. 1968, *ibid.* The Anti-Ballistic Missile Defense program cancelled the Sentinal Project before construction began.
51. E. L. Atkinson, “Hot Stuff to Be Tested in Alaskan Climate,” *Excavation Engineer*, May 1960, pp. 38–41.
52. Gordon Harrison, ed., *Alaska Public Policy* (Fairbanks: Institute of Social, Economic and Government Research, 1971); Hunt, *Alaska*, p. 116.
53. U.S. Congress, House Document 591, “Supplemental Estimate of Appropriation for the War Department for Engineer Service, Army,” 78th Cong., 2nd sess., 1944.
54. Typewritten history of the CANOL Project, presumably prepared by Alaska District and based on documents from the files of the Resident Engineer can be found in Alaska District, RHA, IHF, 228–10, Box L-8-A-I. The project is also summarized in Jacobs, *History of the Alaska District*, pp. 17–18.
55. Jacobs, *History of the Alaska District*, p. 42; National Resources Planning Board, “Resources and Transportation Facilities in the Area Tributary to the Trans-Canadian-Alaska Railway, Western Division,” March 1943, pp. 25–26.
56. Jacobs, *History of the Alaska District*, pp. 43–44.

57. Hunt, *Alaska*, pp. 155–56; Ernest Gruening, *The State of Alaska* (New York: Random House, 1968), pp. 535–36.
58. Hanburger, Speech to Greater Anchorage Chamber of Commerce, 21 Feb. 1961, copy in Alaska District, RHA, IHF, Box L-8-B-I.
59. Hyzer to Cassidy, 29 April 1966, NPD Quarterly Reports; Jacobs, *History of the Alaska District*, pp. 52–53.
60. Report of Stanford Research Institute summarized in Anchorage *Daily News*, 27 Dec. 1969.
61. Brookings Institution, “A Conference on the Future of Alaska, Fall 1969,” summarized in Hunt, *Alaska*, pp. 174–75.
62. Anchorage *Daily Times*, 30 July 1970.
63. General Comments on Trans-Alaska Pipeline Environmental Impact Statement with letter of Col. Paul Basilwich, Alaska District to Chief, 5 Feb. 1971, Alaska District, RHA, IHF, Box L-8-C-VI.
64. Anchorage *Daily Times*, 5 March 1971.
65. Col. A. R. Marshal, NPD to Clarke, 5 Aug. 1971, Sawyer to Clarke, 10 Nov. 1971, NPD Quarterly Reports; Anchorage *Daily Times*, 30 Nov. 1971.
66. Alaska District, “Briefing Notes for Command Inspection, 3–5 Aug. 1972,” Alaska District, RHA, IHF, Box L-8-A-I.
67. Memorandum, Donald E. Lawyer, Operations Division, OCE, 12 Dec. 1973, OCE Engineering Division Files, “Trans-Alaska Pipeline.”
68. Debelius to NPD Engineer, 11 Dec. 1973; McConnell to OCE, 19 Dec. 1973, *ibid.*
69. Marshall, NPD to OCE, 10 Dec. 1973, Debelius to NPD Engineer, 11 Dec. 1973, *ibid.*
70. For information on discussion of design and structural problems, see Memorandum, Lawyer, 12 Dec. 1973, McConnell to OCE Civil Works, 20 Dec. 1973, and memorandum, Parsons to Corns, OCE Civil Works, 16 Jan. 1974, all in OCE, Engineering Division Files, “Trans-Alaska Pipeline.”
71. McConnell to Chief’s Office, 20 Dec. 1973 and Memorandum of Lawyer, 12 Dec. 1973, *ibid.*; McConnell to Gribble, 25 Jan. and 23 April 1974, NPD Quarterly Reports.
72. Arctic Institute of North America, “The Alaska Arctic Coast: A Background Study of Available Knowledge,” June 1974, copy in Alaska District Library; McConnell to Gribble, 1 Nov. 1974, and Robertson to Peel, 14 Oct. 1977, NPD Quarterly Reports.
73. Kenai Peninsula *Clarion*, 2 and 9 March and 18 May 1978; Anchorage *Daily Times*, 26 July 1978.
74. Anchorage *Daily News*, 4 Nov. 1978.
75. Alaska District, *Prudhoe Bay Oil Field Waterflood Project Final Environmental Impact Statement*, Vol. 1, 1980, pp. S-3 to S-5.
76. *Ibid.*, Vol. 3, pp. 120, 122–131.
77. Alaska District, “Debris Removal and Cleanup Study, Aleutian Islands and Lower Alaska Peninsula,” June 1977, copy in Alaska District Library.
78. *Ibid.*

EPILOGUE

Colonel William Heuer would have been amazed at the transformation of the North Pacific Division from the small office he headed in 1901. By 1980 the Division, under General Richard Wells, with its 18 separate offices and over 400 employees, directs the efforts of 4 districts. However, the most startling changes were in the breadth of responsibilities.

From a federal agency whose principal charge was navigation improvements, the Division grew to become an office that in 1980 handled a variety of complex water resource projects and issues, most unforeseen in Heuer's time. Even his atlas now would be supplanted by aerial photographs showing a series of dams on the Columbia system, and jetties extending outward from river mouths into the ocean. A modern map of the Division would embrace Idaho and western Montana and, stretching into the Arctic Circle, would include the State of Alaska. The shelves behind his desk would contain an overflow of documents, some bearing the strange titles of environmental impact statements; his correspondence would concern subjects rarely discussed or perhaps even unknown during his tenure – wildlife mitigation, Operation Fish Run, salvage archaeology, and, curiously for a man living when the Columbia's potential seemed limitless, water shortages.

In fact, of all the issues confronting him, General Wells cited that of water allocation as "the biggest question waiting to be settled in the Pacific Northwest." People are just beginning to realize that water is becoming scarce. The solution will be found in compromise, Wells believed in western states finding a balance between the needs of upstream and downstream users. The North Pacific Division will remain a major player in helping resolve conflicts through its studies and recommendations for the optimum uses of the Columbia system.

In conducting studies, making analyses, and seeking to bring about effective compromises in water allocation and other crucial issues, the North Pacific Division has entered the challenging decade of the 1980s.

BIBLIOGRAPHY

MANUSCRIPTS AND REPORTS

Alaska Engineer District. *Rampart Canyon Dam and Reservoir and Fairbanks Flood Control Project*. North Pacific Division District Engineers Conference, June 1966.

_____. *Report of the Historical Record of Alaska District, 9 September 1951 to 31 December 1951*. Alaska District.

_____. *Report, History of Corps of Engineers Relating to Current Mobilization, May 1952 to December 1952*. Alaska District.

National Resources Planning Board. *Resources and Transportation Facilities in the Area Tributary to the Trans-Canadian-Alaskan Railway*, Western Division, March 1943.

North Pacific Division. *After-Action Report Operation Foresight Spring 1969*. Portland, July 1969.

Petersen, Keith. *The Army Corps of Engineers and the Environment in the Pacific Northwest*. Unpublished manuscript, 1982. Copy in Office of History, Office of the Chief of Engineers.

Reuss, Martin. Andrew A. Humphreys and the Development of Hydraulic Engineering: Politics and Technology in the Army Corps of Engineers, 1850-1950. Unpublished manuscript. Copy in Office of History, Office of the Chief of Engineers.

Schubert, Frank N. *From the Potomac to the Columbia: The Corps of Engineers and Anadromous Fisheries*. Unpublished manuscript, December 1978. Copy in Office of History, Office of the Chief of Engineers.

U.S. Department of the Army. Office, Chief of Engineers, Board of Engineers for Rivers and Harbors. Minutes, "Hearing on Subject of Ship Channel in the Columbia River" The Dalles, Oregon, 31 May 1934. Typescript copy in the Portland District Library.

_____. Office, Chief of Engineers. Board of Engineers for Rivers and Harbors. "Report of Testimony and Statements on Comprehensive Development of the Columbia River, Vol. 2," *Proceedings*. Washington, D.C., 1949.

_____. Office, Chief of Engineers. Grays Harbor Widening and Deepening, Revised Draft Environmental Impact Statement. Washington, D.C., 1976.

_____. Office, Chief of Engineers. Report from the Chief of Engineers Office, "Corps of Engineers Functions and the National Interest." Vol. 2, April 1953.

U.S. Department of the Interior. Fish and Wildlife Service. Draft, Fish and Wildlife Coordination Act Report, U.S. Army Corps of Engineers, Grays Harbor and Chehalis River Improvements to Navigation Project. Olympia: U.S. Fish and Wildlife Service, 1981.

Walla Walla Engineer District. Transcript of "Public Hearing on Feasible Storage Sites, Middle Snake River and Tributaries," Orofino, Idaho: Walla Walla District, November 1953.

Weinmann, Fred C. and Malek, John. "Planning for Maintenance Dredging in Grays Harbor Estuary". Paper presented to the American Society of Civil Engineers Publications Services, 30 December 1977. Copy in "Grays Harbor" Seattle District Planning Branch Files.

THESES AND DISSERTATIONS

Brown, Estella Dee. "The Corps of Engineers in the Pacific Northwest." Bachelors thesis, Reed College, 1952.

Green, Michael. "Politics and Kilowatts: Washington Water Power Company and Public Power, 1918-1941." Master's thesis, University of Idaho, 1962.

Merritt, Gordon Lee. "Prelude to Slackwater." Masters thesis, University of Idaho, 1973.

CONGRESSIONAL DOCUMENTS

- U.S. Congress. *Inland Waterways Commission Report*. 60th Cong., 1st sess., 1908.
- U.S. Congress. *Hearing on a Bill to Provide for the Improvement of the Columbia and Snake Rivers*. 72d Cong., 2d sess., 1932.
- U.S. Congress. House. *Preliminary Examination and Survey of Wrangell Narrows*. H. Doc. 39, 58th Cong., 2d sess., 1903.
- U.S. Congress. House. *Estimate of Cost of Examinations, etc., of Streams Where Power Development Appears Feasible*. H. Doc. 308, 59th Cong., 1st sess., 12 April 1926.
- U.S. Congress. House. *St Michael Canal, Alaska, 4 January 1907*. H. Doc. 389, 59th Cong., 2d sess.
- U.S. Congress. House. *Duplication of Activities by the War Department and the Bureau of Reclamation*. 71st Cong., 2d sess., 27 June 1930.
- U.S. Congress. House. *Columbia River and Minor Tributaries*. H. Doc. 103, 73d Cong., 1st sess., 1933.
- U.S. Congress. House. *Snake River Tributaries*. H. Doc. 190, 73d Cong., 2d sess., 1934.
- U.S. Congress. House. *Preliminary Report on the Development of the Rivers of the United States*. H. Doc. 395, 73d Cong., 2d sess., 1934.
- U.S. Congress. House. *Authorizing the Survey, Location and Construction of a Highway to Connect the Northwestern part of Continental United States and British Columbia, Yukon Territory, and the Territory of Alaska*. H. Rept. 1429, 74th Cong., 1st sess., 5 July 1935.
- U.S. Congress. House. *Willamette River and Tributaries*. H. Doc. 544, 75th Cong., 3d sess., 1938.
- U.S. Congress. House. *Tanana River and Chena Slough, Alaska*. H. Doc. 561, 75th Cong., 3d sess., 1938.
- U.S. Congress. House. *Report on the Columbia and Snake Rivers*. H. Doc. 704, 75th Cong., 3d sess., 1938.
- U.S. Congress. House. *Report on Reexamination of Columbia and Rivers*. H. Doc. 704, 75th Cong., 4th sess., 1938.
- U.S. Congress. House. Committee on Rivers and Harbors. *Hearings on the Improvement of the Columbia River (Umatilla Dam), Oregon and Washington*. 76th Cong., 1st sess., 17 April 1939.
- U.S. Congress. House. *Report of the Alaskan International Highway Commission*. H. Doc. 74, 76th Cong., 3d sess., 20 April 1940.
- U.S. Congress. House. *Report of the Alaskan International Highway Commission*. H. Doc. 711, 76th Cong., 3d sess., April 1940.
- U.S. Congress. House. Committee on Rivers and Harbors. *Hearings on the Improvement of the Snake River, Oregon, Washington and Idaho*. 77th Cong., 1st sess., 22 September 1941.
- U.S. Congress. House. Hearings Before the House Committee on Rivers and Harbors. *The Improvement of the Columbia and Snake Rivers*. 78th Cong., 1st sess., 13, 22, and 27 October 1943.
- U.S. Congress. House. Hearings of the House Committee on Rivers and Harbors. *The Improvement of the Snake River*. 78th Cong., 2d sess., 10 February 1944.
- U.S. Congress. House. *Supplemental Estimate of Appropriation for the War Department for Engineer Service, Army*. H. Doc. 591, 78th Cong., 2d sess., 1944.
- U.S. Congress. House. *The Columbia River, Final Letters of Transmission*. H. Doc. 531, 81st Cong., 2d sess., February 1950.
- U.S. Congress. House. *Columbia River and Tributaries*. H. Doc. 531, 81st Cong., 2d sess., 1950.
- U.S. Congress. House. *Alaska, A Reconnaissance Report on the Potential Development of Water Resources in the Territory of Alaska for Irrigation, Power Production, and Other Beneficial Uses*. H. Doc. 197, 82d Cong., 1st sess., January 1952.
- U.S. Congress. House. *Southeastern Alaska*. H. Doc. 501, 82d Cong., 2d sess., 1953.
- U.S. Congress. House. *Copper River and Gulf Coast*. H. Doc. 182, 83d Cong., 1st sess., 1953.

- U.S. Congress. House. *Report on a Partial Preliminary Examination and Interim Survey of Harbors and Rivers in Alaska*. H. Doc. 44, 83rd Cong., 2d sess., 1954.
- U.S. Congress. House. *Tanana River Basin, Alaska*. H. Doc. 137, 84th Cong., 1st sess.
- U.S. Congress. House. *Southwestern Alaska*. H. Doc. 390, 84th Cong., 2d sess., 1957.
- U.S. Congress. House. *Northwestern Alaska*. H. Doc. 99, 86th Cong., 1st sess., 1959.
- U.S. Congress. House. *Plan of Development for the Proposed Crater – Long Lakes Division, Snettisham Project, Alaska*. H. Doc. 40, 87th Cong., 1st sess., 1961.
- U.S. Congress. House. *Columbia River and Tributaries*. H. Doc. 403, 87th Cong., 2d sess., 1962.
- U.S. Congress. House. *Interim Report No. 7, Yukon and Kuskokwim River Basins, Alaska*. H. Doc. 218, 88th Cong., 2d sess., 1964.
- U.S. Congress. House. Hearings Before a Sub-committee of the Committee on Appropriations, Part 1, Civil Functions, Department of the Army. *Public Works Appropriations for 1969 for Water and Power Resources Development and the Army Corps of Engineers*. 90th Cong., 2d sess., March 1968.
- U.S. Congress. House. Conservation and Natural Resources Subcommittee. *House Hearings on Mercury Pollution and Enforcement of the Refuse Act of 1899*. 92d Cong., 1st sess., 1971.
- U.S. Congress. Senate. *Report of Reconnaissance of the Yukon River*. S. Exec. Doc. 12, 42d Cong., 1st sess., 1871.
- U.S. Congress. Senate. *Report on the Salmon Fisheries of the Columbia River*. S. Exec. Doc. 123, 50th Cong., 1st sess., 1888.
- U.S. Congress. Senate. *Report of Commissioner of Fish and Fisheries on Investigations in Columbia River Basin in Regard to Salmon Fisheries*. S. Misc. Doc. 200, 53d Cong., 2d sess., 31 May 1894.
- U.S. Congress. Senate. Inland Waterways Commission. *Message from the President Transmitting a Preliminary Report of the Inland Waterways Commission*. S. Doc. 325, 60th Cong., 1st sess., 1908.
- U.S. Congress. Senate. National Waterways Commission. *Final Report*. S. Doc. 469, 62d Cong., 2d sess., 1912.
- U.S. Congress. Senate. Committee on Irrigation and Reclamation. *Columbia Basin Project*. 69th Cong., 2d sess., 1927.
- U.S. Congress. Senate. Committee on Irrigation and Reclamation. *Columbia Basin Reclamation Project*. S.R. 345, 70th Cong., 1st sess., 1928.
- U.S. Congress. Senate. Committee on Irrigation and Reclamation. *Bill to Provide for the Construction of Works for the Development of the Columbia River and Minor Tributaries and for other Purposes*. 72d Cong., 2d sess., 1932.
- U.S. Congress. Senate. Committee on Irrigation and Reclamation. *Hearing on a Bill to Provide for the Construction of Works for the Development of the Columbia and Snake Rivers*. 72d Cong., 2d sess., 1932.
- U.S. Congress. Senate. *Report of the Commissioner of Fisheries*. S. Doc. 87, 75th Cong., 1st Sess., 1937.
- U.S. Congress. Senate. *Middle Snake River and Tributaries, Wyoming, Idaho, Oregon and Washington*. S. Doc. 51, 84th Cong., 1st sess., 1955.
- U.S. Congress. Senate. Committee on Public Works. *The Market for Rampart Power*. 87th Cong., 2d sess., 1962.
- U.S. Congress. Senate. *The Snettisham Project, Alaska*. S.R. 1786, 87th Cong., 2d sess., 25 July 1962.

BOOKS, PAMPHLETS AND PUBLIC DOCUMENTS

- Alaska Engineer District. *Alaska Good Friday Earthquake, 27 March 1964, After Action Report*. Alaska District, 1964.
- _____. *Debris Removal and Cleanup Study, Aleutian Islands and Lower Alaska Peninsula*. Alaska District, June 1977.
- _____. *Harbors and Rivers in Alaska, Interim Report No. 3, River and Gulf Coast*. Alaska District, 30 October 1950.
- _____. *Harbors and Rivers in Alaska, Survey Report, Interim Report No. 2., Cook Inlet and Tributaries*. Alaska District, 20 January 1950.

- _____. *Harbors and Rivers in Alaska, Survey Report, Interim Report No. 6.*, Northwestern Alaska. Alaska District, 1 June 1956.
- _____. *Prudhoe Bay Oil Field Waterflood Project Final Environmental Impact Statement*. Vol. 1. Alaska District, 1980.
- _____. *Review of Interim Report No. 2, Part 1, Hydroelectric Power, Bradley Lake Project*. Alaska District, 1 June 1960.
- _____. *Review of Interim Report No. 2, Part 2, Navigation and Flood Control*. Alaska District, 31 May 1961.
- _____. *Southcentral Railbelt Area, Alaska, Upper Susitna River Basin, Interim Feasibility Report*. Alaska District, 1975.
- American Society of Civil Engineers, Portland Section. *Review of the U.S. Engineer's Report on Columbia River*. Portland, 1932.
- Arctic Institute of North America. *The Alaska Arctic Coast: A Background Study of Available Knowledge*. June 1974.
- Armstrong, Ellis L., ed. *History of Public Works in the United States, 1776–1976*. Chicago: American Public Works Association, 1976.
- Bessey, Roy F. *Pacific Northwest Regional Planning: A Review*. Olympia, Washington, 1963.
- _____. *The Public Issues of Middle Snake River Development: The Controversy Over Hells Canyon and Nez Pierce Reaches*. State of Washington Division of Power Resources Bulletin No. 9. Olympia, 1964.
- Bishop, A Bruce, author. *Public Participation in Water Resources Planning*. IWR Report 70–7, 1970. Alexandria, VA., 1970.
- Bullard, Carl. *Crisis on the Columbia*. Portland: Touchstone Press, 1968.
- Chaney, Ed and Perry, L. Edward. *Columbia Basin Salmon and Steelhead Analysis*. Pacific Northwest Regional Commission, 1976.
- Clark, Norman H. *Washington: A Bicentennial History*. New York: W. W. Norton & Co., Inc, 1976.
- Clausen, Charles M., ed. *Engineering a Victory for Our Environment: A Citizen's Guide to the U.S. Army Corps of Engineers*. Sierra Club, 1973.
- Cohen, Stan. *The Trail of 42: A Pictorial History of the Alaska Highway*. Missoula: Pictorial Histories Publishing Co., 1982.
- Columbia Basin Inter-Agency Committee. *Report on Streamflow Depletion, Columbia River Basin*. 1957.
- Corning, Howard McKinley. *Willamette Landings*. Portland: Oregon Historical Society, 1947.
- Dill, Clarence C. *Where Water Falls*. Published by the author, 1970.
- Dicken, Samuel and Emily. *The Making of Oregon: A Study in Historical Geography*. Portland: Oregon Historical Society, 1979.
- Dod, Karl C. *The Corps of Engineers: The War Against Japan*. United States Army in World War II. Washington, D.C.: Department of the Army, Office, Chief of Military History, 1972.
- Elling, Carl and Ebel, Wesley. *Nitrogen Supersaturation in the Columbia and Snake Rivers – A Disaster or Blessing in Disguise?* Seattle: Northwest Fisheries Center, 1973.
- Fine, Lenore and Remington, Jessie A. *The Corps of Engineers: Construction in the United States*. United States Army in World War II. Washington, D.C.: Department of the Army, Office, Chief of Military History, 1972.
- Gardner, Robert. *Social Impact Study of the Proposed Willow Creek Flood Control Project*. Walla Walla District, 1973.
- Green, Sherman. *History of the Seattle District, 1896 – 1968*. Seattle, 1969.
- Goetzmann, William H. *Army Exploration in the American West, 1803–1863*. New Haven: Yale University Press, 1959.
- _____. *Exploration and Empire: The Explorer and the Scientist in the Winning of the American West*. New York: Alfred A. Knopf, 1967.
- Federal Power Commission. *Alaska Power Survey*. Washington, D.C.: Government Printing Office, 1969.
- Gruening, Ernest. *The State of Alaska*. New York: Random House, 1968.
- Harrison, Gordon, ed. *Alaska Public Policy*. Fairbanks: Institute of Social Economic and Government Research, 1971.

- Hays, Samuel P. *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890–1920*. Cambridge: Harvard University Press, 1959.
- Hevelmans, Martin. *The River Killers*. Harrisburg, Pennsylvania: Stackpole Books, 1974.
- Holmes, Beatrice Holt. *A History of Federal Water Resources Programs, 1800–1960*. Miscellaneous Publication No. 1233. Washington, D.C.: 1972. U.S. Department of Agriculture, Economic Research Service.
- _____. *History of Federal Water Resources Programs and Policies, 1961 – 1970*. Miscellaneous Publication No. 1379. Washington, D.C.: U.S. Department of Agriculture, Economics, Statistics, and Cooperative Service. Government Printing Office, 1979.
- Holt, William Stull. *The Office of the Chief of Engineers of the Army. Its Non-Military History, Activities, and Organization, Service Monographs of the United States Government, No. 27*. Baltimore: The John Hopkins Press, 1923.
- Hunt, William R. *Alaska, A Bicentennial History*. New York: W. Norton and Co. Inc, 1976.
- Institute for Water Resources. *Environmental Guidelines for the Civil Works Program of the Corps of Engineers*. Washington, D.C.: Government Printing Office, 1971.
- Jacobs, Will A. *History of the Alaska District, United States Army Corps of Engineers, 1846–1974*. Alaska District, 1974.
- Jameson, John R., Petersen, Keith and Reed, Mary. *Walla Walla District History, Part III, 1975–1980*. Walla Walla District, 1981.
- Johansen, Dorothy O., and Gates, Charles M. *Empire of the Columbia*. New York: Harper and Row, 1957.
- Krutilla, John V. *The Columbia River Treaty. The Economics of an International River Basin Development*. Baltimore: The John Hopkins Press, 1967.
- Lewis, John H. "Oregon's Opportunity in National Preparedness." In *Bulletin No. 5*. Salem, Oregon: Office of the State Engineer, 1916.
- Lewis, Howard T., and Miller, Stephen I., eds. *Economic Resources of the Pacific Northwest*. Seattle: Lowman and Hanford Company, 1923.
- Maass, Arthur. *Muddy Waters: The Army Engineers and the Nation's Rivers*. Cambridge: Harvard University Press, 1951.
- Mazmanian, Daniel A., and Nienaber. *Can Organizations Change? Environmental Protection, Citizen Participation and the Corps of Engineers*. The Brookings Institution, Washington, D.C., 1979.
- McKinley, Charles. *Uncle Sam in the Pacific Northwest: Federal Management of Natural Resources in the Columbia River Valley*. Berkeley: University of California Press, 1952.
- Meining, Donald W. *The Great Columbia Plain: A Historical Geography, 1805–1910*. Seattle: University of Washington Press, 1968.
- Morgan, Murray. *The Columbia*. New York American Book – Stratford Press, Inc., 1949.
- Nash, Wallis. *Oregon: There and Back in 1877*. London: Macmillan Co., 1878, reprinted by the Oregon State University Press.
- National Resources Committee. *Alaska Its Resources and Development, Regional Planning, Part VII*. Washington, D.C.: Government Printing Office, 1938.
- _____. "Pacific Northwest Regional Planning Commission Report," *Regional Planning, Part I: Pacific Northwest*. Washington, D.C.: U.S. Government Printing Office, 1936.
- Netboy, Anthony. *Salmon of the Pacific Northwest*. Portland: Binfords and Mort, 1958.
- Neuberger, Richard L. *Our Promised Land*. New York: Macmillan Co., 1938.
- North Pacific Division. *An Introduction to the Columbia River and Tributaries Plan of Study, Coordination Report, 1971*. Portland, 1971.
- _____. *Columbia River and Tributaries Review Study, Plan of Survey*. Portland, 1973.
- _____. *Columbia River and Tributaries Review Study. Record of Public Meetings, August 23–30, 1972, Vol. 1*. Portland, 1972.

- _____. *Inventory of Problems and Areas of Concern*, 1973. Portland, 1973.
- _____. *Inventory of Problems and Areas of Concern* 1974. Portland, 1974.
- _____. *North Pacific Division Recreation Program Overview*. Portland, 1978.
- _____. *Water Resources Development by the U.S. Army Corps of Engineers in Oregon*. Portland, 1979.
- _____. *Water Resources Development in Alaska*, 1981. Portland, 1981.
- _____. *Water Resources Development in Washington*. Portland, 1979.
- Norwood, Gus. *Columbia River Power for the People: A History of Policies of the Bonneville Power Administration*. Portland: Bonneville Power Administration, 1981.
- Oregon State Planning Board. *The Willamette Valley Project: A Regional Plan*. Salem, 1935.
- Oregon State Planning Board. *Oregon Looks Ahead*. Salem, November 1938.
- Pacific Northwest River Basin Commission, Water Resources and Power Division. *Proceedings*. Seattle, Washington, 12-13 December 1934. Washington State University Library.
- Pacific Northwest River Basin Commission. *Willamette Basin Comprehensive Study: Water and Related Land Resources*. 1969.
- Park, Donn L. *Transportation of Chinook Salmon and Steelhead Smolts, 1968-1980, and its Impact on Adult Returns to the Snake River*. October 1980, Prepared for the National Oceanic and Atmospheric Administration, Seattle, Washington.
- Peterson, James N. et al. *Pacific Northwest Regional Wind Energy Studies*. Walla Walla District, 1978.
- Portland Engineer District. *Bonneville Second Powerhouse Design Memorandum No. 8, Relocation of City of North Bonneville, Washington*. Vol 1. Portland District, 1975.
- _____. *Columbia River and Its Tributaries Review Report, Interim Report No. 3, Hells Canyon, Dam, Snake River*. 22 December 1947. Portland District, 1947.
- Potter, General William E. *Engineer Memoirs*. Washington, D.C.: U.S. Army Corps of Engineers, Office of the Chief of Engineers, 1983.
- President's Water Resources Policy Commission. *Report of the Commission*, Vol. 3, *Water Resources Law*. Washington, D.C.: Government Printing Office, 1950.
- _____. *Ten Rivers in America's Future*, Vol. 2. Washington, D.C.: Government Printing Office, 1950. Preston, Howard.
- _____. *Walla Walla District History, Vol. I, 1948-1970*. Walla Walla District, 1971.
- _____. *Walla Walla District History, Part II, 1970-1975*. Walla Walla District, 1976.
- Reuss, Martin. *Shaping Environmental Awareness: The U.S. Army Corps of Engineers Environmental Advisory Board, 1970-1980*. Washington, D.C.: Office of the Chief of Engineers, 1982.
- Seattle Engineer District. *Environmental Statement, Grays Harbor and Navigation Project, Washington*. Seattle District, 1970.
- _____. *Long-Range Maintenance Dredging Program. Final EIS Supplement No. 2*. Seattle District, 1980.
- _____. *Public Meeting on Channel Improvements, Grays Harbor, Washington*. Seattle District, 1976.
- _____. *Public Meeting on Grays Harbor, Chehalis River and Hoquiam River, Washington, Navigation Channel Improvements*. 22 May 1975. Seattle District, 1975.
- Scheufele, Roy W. "History of the Columbia Basin Inter-Agency Committee." Portland: Portland District, n.d.
- _____. *History of the North Pacific Division, U.S. Army Corps of Engineers. 1888-1965*. Portland: North Pacific Division, n.d.
- Schubert, Frank N. *Vanguard of Expansion: Army Engineers in the Trans-Mississippi West, 1819-1879*. Washington, D.C.: Government Printing Office, 1980.
- Sherwood, Morgan B. *Exploration of Alaska: 1865-1900*. Yale Western Americana Series No. 7. New Haven: Yale University Press, 1965.
- Spritzer, Donald E. *Water of Wealth: The Story of the Kootenai River and Libby Dam*. Boulder, Colorado: Pruett Publishing Co, 1979.

- Sundborg, George. *Hail Columbia: The Thirty-Year Struggle for Grand Coulee Dam*. New York: Macmillan Co., 1954.
- Swain, Donald C. *Federal Conservation Policy 1921-1933*. Berkeley: University of California Press, 1963.
- Symons, Thomas William. *Report on the Upper Columbia River and the Great Plains of the Columbia*. Fairfield, Washington: Ye Galleon Press, 1967.
- U.S. Army Engineer Waterways Experiment Station. *Dredged Materials, a Potential Resource*. Vicksburg, Mississippi, n.d.
- U.S. Comptroller General. *Montana's Libby Dam Project: More Study Needed Before Adding Generators and a Regulating Dam*. Washington, D.C.: General Accounting Office, 1979.
- U.S. Department of the Army. Alaskan Command, *Building Alaska with the U.S. Army, 1867-1962*. Seattle: Headquarters, U.S. Army, Alaska, 1962. (US Army Pamphlet No. 355-5).
- U.S. Department of the Army. Office, Chief of Engineers. *Annual Reports of the Chief of Engineers*. (ARCE).
- _____. Office, Chief of Engineers. *Columbia River Basin, Report to the President's Water Resources Policy Commission*. Washington, D.C., 1950.
- _____. Office, Chief of Engineers. *Digest of Water Resources Policies and Authorities*. Eng Pamphlet No. 1165-2-1. Washington, D.C., 1979.
- _____. Office, Chief of Engineers. *Grays Harbor Widening and Deepening Revised Draft Environmental Impact Statement*. Washington, D.C., 1976.
- _____. Office, Chief of Engineers. *Review of Report on the Columbia River, Washington and Oregon*. Washington, D.C., 1934.
- U.S. Department of the Interior, *Rampart Canyon Dam and Reservoir Project*. 1964.
- Walla Walla Engineer District. *Irrigation Depletions/Instream Flow Study*. Walla Walla District, 1976.
- _____. *Lower Snake River Fish and Wildlife Compensation Plan, Revised Draft Environmental Impact Statement*. Washington, D.C. U.S. Army Corps of Engineers, Office of the Chief, June 1975.
- _____. *Public Hearings, Columbia River and Tributaries, Middle Snake River Basin*. Part I, Appendix 5. Orofino, Idaho. 20 November 1950. .
- _____. *Record of Public Meetings, Special Lower Snake Report*. Walla Walla District, 1973.
- _____. *Special Report: Lower Snake River Fish and Wildlife Compensation Plan, 1975*. Walla Walla District.
- _____. *Upper Snake River Basin Interim Report No.1*. Walla Walla District, 1962.
- Willingham, William F. *Army Engineers and the Development of Oregon: A History of the Portland District, U.S. Army Corps of Engineers*. Portland District, 1983.
- _____. *Water Power in the "Wilderness," The History of Bonneville Lock and Dam*. Portland District, 1987.
- Woods, Rufus. *The Twenty-Three Year Battle for Grand Coulee Dam*. Wenatchee, Washington: *Wenatchee Daily World*, 1944.

ARTICLES

- Atkinson, E. L. "Hot Stuff to Be Tested in Alaskan Climate." *Excavation Engineer*, May 1960.
- Bachus, Brig. Gen. Walter O. "Beneficial Uses of Dredged Material." *The Military Engineer* 67:436 (March-April 1975).
- Barnes, Lynn C. "Permafrost, A Challenge to Engineers." *The Military Engineer* 30:245 (January 1946).
- Burkholder, H. Dale and Ramsey, Kenneth. "Relocation Routes at Libby Reservoir." *The Military Engineer* 61:404 (November-December 1969).
- Chaney, Ed. "Too Much for the Columbia." *National Wildlife*, April-May 1970.
- Cooke, Alan. "The Rampart Dam Proposal for Yukon River." *Polar Record* 12:78, 1964.
- "Conservation." *Nature Magazine*, January 1937. No author given.
- Cowdrey, Albert E. "Pioneering Environmental Law" *Pacific Historical Review* 46:3 (August 1975).

Cowdrey, Albert E. "Pioneering Environmental Law" *Pacific Historical Review* 46:3 (August 1975).

"Deep Freeze at Rampart Canyon." *Pacific Builder and Engineer*, May 1961. No author given.

Dimond, Anthony J. "The Strategic Value of Alaska." *The Military Engineer* 33:187 (January – February 1941).

Dodge, B. H. "Achieving Public Involvement in the Corps of Engineers, Water Resources Planning." *Water Resources Bulletin*, Vol. 9, June 1973.

Gribble, Willam C. "Foundations in Permafrost." *The Military Engineer* 52:350 (November – December 1960).

Hanburger, Christian. "Hydroelectric Power for Alaska." *The Military Engineer* 53:356 (November – December 1961).

Hardin, John R. "Engineers Rush Alaskan Defenses." *The Military Engineer* 34:195 (January 1942).

Holmes, Harlan. "The Passage of Fish at Bonneville Dam." In Oregon Fish Commission *Contribution No. 2*. Salem: Oregon Fish Commission, 1940.

"Hydropower from the Yukon River" *Western Construction* 34:5, May 1959.

Itschner, Maj. Gen. Emerson C. "The Corps of Engineers in Water Resource Development." *The Military Engineer* 46:311 (May – June 1954).

Johnson, Oliver and Pederson, Clarence. "High Water in the Far West." *The Military Engineer* 57:376 (March – April 1965).

Kelly, William. "Work of the Federal Power Commission Since Its Creation, June 1920." *The Military Engineer* 14:17 (September – October 1922).

Kehe, L. William. "Progress at Snettisham." *The Military Engineer* 66:420 (July – August 1972).

King, Frank. "Operation Fish Run." *Water Spectrum* 9:4, Fall 1977.

Kuentz, Oscar O. "The Lower Columbia River Project." *The Military Engineer* 25:139 (January – February 1933).

Lang, Henry P. "Special Features at Snettisham." *The Military Engineer* 66:432 (July – August 1974).

Marts, Marion. "The Columbia River: Some Contemporary Conflicts." In *The Columbia River: An Inexhaustible Resource?* edited by Dale F. Stradling. Cheney, Washington: The Northwest Institute for Advanced Studies, 1980.

McConnell, Richard E. "Libby Dam and Reservoir." *The Military Engineer* 61:401 (May – June 1969).

McKenney, Virginia. "Final Push Begins on Chena Flood Control Project." *Alaska Industry*, April 1978.

Moore, Cecil R. "The Lower Columbia River" *The Military Engineer* 31:175 (January – February 1939).

Northwest Regional Council. "Pacific Northwest Problems and Materials: An Introduction." Know Your Northwest series. Portland, 1940.

Norwood, Gus. "Wings Over the Yukon." *The Pacific Power Bulletin* 15:7 (July 1961).

Noyes, John R. "Waterway Improvements in Alaska." *The Military Engineer* 28:126 (November – December 1936).

Opp, Weldon and Wylie, Allan. "Susitna Survey. Concern for the Land." *Water Spectrum* 11:4 (Fall 1979).

Robbins, William G. "The Willamette Valley Project of Oregon: A Study in the Political Economy of Water Resource Development." *Pacific Historical Review* 47:4 (November 1978).

Sanchez, Edward N. "The Holey Gates." *The Military Engineer* 64:417 (January – February 1972).

Sargent, Col. Howard L. "Fishbowl Planning Immerses Pacific Northwest Citizens in Corps Projects." *Civil Engineering* 42 (September 1972).

Sawyer, Kenneth J. "Effects, Reaction and Recovery." *The Military Engineer* 56:372 (July – August 1964).

Seattle Engineer District and State of Washington Department of Ecology. *Middle Fork Snoqualmie River Joint Study: Report to Governor Evans*. June 1973.

Steese, James Gordon. "Public Works in Alaska" *The Military Engineer* 16:85 (January – February 1924).

Steese, James Gordon. "The Roads of Alaska: Work of the Alaska Road Commission." *The Military Engineer* 13:67 (January – February 1921).

- Steinbom, Sydney. "Aesthetic Factors in Planning and Design of Libby Dam." *Journal of the Power Division, Proceedings of the American Society of Civil Engineers*. January 1970.
- Swendsen, W. G. *Special Report on the Allocation of Columbia Water Supply*. Boise: Idaho State Department of Reclamation, 12 January 1927.
- Thomson, Burslem. "The Rise and Fall of Traffic on the Willamette River above Portland, Oregon." *The Military Engineer* 13:71 (September – October 1921).
- Warner, Robert R., and Wall, John F. "The Army Corps of Engineers and NEPA" *The Military Engineer* 66:430 (March – April 1974).
- Weaver, Theron D. "The Columbia River Between Vancouver and The Dalles." *The Military Engineer* 31:176 (March – April 1939).
- _____. "The Upper Columbia and Snake Rivers." *The Military Engineer* 31:178 (August 1939).
- Willingham, William. "Engineering the Cascades Canal and Locks, 1876–1896." *The Oregon Historical Quarterly* 88:229 (Fall 1987).
- Wilson, Walter K. "The Problem of Permafrost." *The Military Engineer* 40:270 (April 1940).
- Woodman, Lyman L. "Snettisham Challenges the Alaskan Winter." *Water Spectrum* Spring – Summer 1976.

NEWSPAPERS

Anchorage *Daily News*
 Anchorage *Daily Times*
 Anchorage *Tundra Times*
Boeing News
Corps'pondent, Portland Engineer District
East Oregonian
Fairbanks Daily News-Miner
Heppner Gazette Times
Kenai Peninsula Clarion
Ketchikan Daily News
Lewiston Tribune
Matanuska – Susitna Valley Frontiersman
Memphis Commercial Appeal
Oregon Sunday Journal
Portland Oregonian
Richland – Tri City Herald
Seattle Argus
Seattle Daily Times
Seattle Post Intelligencer
Spokane Spokesman-Review
Tacoma Times News
The Oregon Journal
Walla Walla Daily Bulletin

Walla Walla *Union Bulletin*

Wenatchee *Daily World*

MISCELLANEOUS

Aldrich, E. B., Papers. University of Oregon Archives

Dana, Marshall M., Papers. University of Oregon Archives

Dodson, William D. B., Papers. University of Oregon Archives

McNary, Senator Charles L., Papers. "Legislative Files," Manuscript Division, Library of Congress.

North Pacific Division. *Quarterly Reports*.

Pierce, Walter, Papers. *Columbia River Development, General Correspondence*. University of Oregon Archives.

Robins, General Thomas M., Papers. University of Oregon Archives.

Sturgis, Maj. Gen. Samuel D. Jr., Papers. "Command File" and "Interests". North Pacific Division, 1953-1956.

Washington, D.C. U.S. Army Corps of Engineers, Office of History.

U.S. Department of the Army. Office, Chief of Engineers. *Reports of the of Engineers for Rivers and Harbors*.

CHRONOLOGICAL LISTING OF NORTH PACIFIC DIVISION ENGINEERS

1901 -1981

Lieut. Colonel William H. Heur	Oct 1901 – June 1907
Lieut. Colonel Solomon W. Roessler	June 1907 – June 1908
Lieut. Colonel John Biddle	July 1908 – July 1911
Lieut. Colonel Thomas H. Rees	July 1911 – Mar 1914
Lieut. Colonel Charles H. McKinstry	Mar 1914 – July 1915
Lieut. Colonel Charles L. Potter	July 1915 – Nov 1916
Lieut. Colonel James B. Cavanaugh	Nov 1916 – May 1917
Colonel George A. Zinn	June 1917 – Sept 1919
Lieut. Colonel James B. Cavanaugh	Sept 1919 – Aug 1922
Lieut. Colonel Edward H. Schulz	Aug 1922 – May 1923
Lieut. Colonel William J. Barden	June 1923 – June 1927
Colonel Gustave R. Lukesh	July 1927 – July 1931
Colonel Thomas R. Robins	June 1934 – May 1938
Colonel John C. H. Lee	Apr 1938 – Oct 1940
Colonel Richard Park	Oct 1940 – Nov 1942
Colonel Theron D. Weaver	Mar 1946 – July 1949
Colonel Orville E. Walsh	July 1949 – Apr 1952
BG General Emerson C. Itschner	Apr 1952 – Nov 1953
BG General Donald G. Shingler	Nov 1953 – May 1954
BG General Louis H. Foote	May 1954 – Nov 1957
BG General Allen F. Clark	Dec 1957 – Jan 1961
Maj. General Alfred D. Starbird	Feb 1961 – Dec 1961
Maj. General William W. Lapsley	Dec 1961 – Dec 1964
BG General Peter C. Hyzer	Feb 1965 – Feb 1967
BG General Elmer P. Yates	Feb 1967 – Nov 1968
BG General Roy S. Kelley	Jan 1969 – Sept 1971
Maj. General Kenneth T. Sawyer	Sept 1971 – Nov 1972
Maj. General Richard E. McConnell	Dec 1972 – Apr 1975
Maj. General Wesley E. Peel	July 1975 – June 1978
Maj. General Richard M. Wells	June 1978 – July 1981

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Portland District Corps of Engineers (NPP)

CHAPTER I

Page 6 & 7: Oregon Historical Society (OHS) negative #53097-B

Page 8: both, Seattle District Corps of Engineers (NPS)

Page 9: Portland District Corps of Engineers (NPP) Historic file

Page 10: NPP

Page 11: NPS

Page 12: NPP

Page 15: NPP

Page 16: NPP

CHAPTER II

Page 22 & 23: OHS negative #53902

Page 27: NPP

CHAPTER III

Page 32: Office of History, HQ USACE

Page 33: National Archives

Page 35: NPS

CHAPTER IV

Page 46 & 47: NPP

Page 49: NPP

Page 54: NPP

CHAPTER V

Page 60 & 61: NPP

Page 65: Walla Walla District Corps of Engineers (NPW)

CHAPTER VI

Page 70 & 71: NPP

Page 73: NPP

CHAPTER VII

Page 82 & 83: NPP

Page 87: NPP

Page 88: both, NPP

Page 90: NPW

Page 93: NPW

CHAPTER VIII

Page 98 & 99: NPP

Page 100: NPP

Page 102: upper, NPP; lower NPS

Page 103: Alaska District Corps of Engineers (NPA)

Page 105: both, NPP

Page 108: NPW

CHAPTER IX

Page 112 & 113: NPP

Page 115: NPP

Page 121: NPW

CHAPTER X

Page 128 & 129: NPW

Page 130: NPW

Page 134: both, NPP

Page 138: NPS

Page 140: both, NPS

Page 142: both, NPW

Page 143: both, NPW

CHAPTER XI

Page 148 & 149: NPS

Page 153: NPS

Page 155: NPS

Page 156: NPP

CHAPTER XII

Page 162 & 163: NPP

Page 165: NPW

Page 168: NPP

Page 169: NPW

Page 173: NPW

Page 175: NPW

CHAPTER XIII

Page 180 & 181: NPP
Page 183: NPP
Page 188: both, NPW
Page 189: all, NPW
Page 190: NPW

CHAPTER XIV

Page 198 & 199: NPA
Page 200: NPA
Page 201: NPA
Page 202: OHS negative #77456
Page 203: upper, OHS negative #50799 ; lower, NPA
Page 204: NPA
Page 207: both, NPA
Page 208: NPA
Page 210: NPA

CHAPTER XV

Page 216 & 217: NPA
Page 218: NPA
Page 219: NPA
Page 223: NPA
Page 225: both, NPA
Page 226: both, NPA
Page 227: both, NPA
Page 232: NPA
Page 233: all, NPA

INDEX

A

ALCAN (Alaska to Canada) Road, 103–104, 205–206, 219

ALCANGO (Alaska–Canada Gas Oil Pipeline), 229

ALCOA (Aluminum Company of America), 104

Alaska: Arctic, 212, 218–220, 227, 229, 232; defenses, 205–207; description, 212; earthquake, 1964, 225, 231; floods, 1967, 225; hydropower resources, 222, 224; inland passage, 201–202, 209; nuclear energy, 227–228; oil exploration, 220, 228, 231–233; oil pipeline, 205–206; transportation, 100–104, 222, 228, 232. Also see ALCAN Road, Alaska Railroad, Alaska Road Commission, and Alaskan International Rail and Highway Commission.

Alaska Department of Natural Resources, 222, 232

Alaska International Rail and Highway Commission, 103, 206

Alaska Power Administration, 220, 222–225

Alaska Railroad, 1942 Survey, 104

Alaska Resources Advisory Committee, 204–205

Alaska Road Commission, 200, 202, 204, 211, 212

Alaska Survey Reports: Copper River and Gulf Coast, 201, 209, 211

Alaskan Federation of Natives, 228, 232

Albany, 10, 85–86

Aldrich, E. B., 74

Aleyska pipeline, 230–232

Allaire, Christopher J., 93

Aleutian Islands, 100, 102–104, 206, 211, 228, 233

Alsek River, 201

Amchitka Island, 228

American Forest Institute, 183

American Indian Federation, 169

American Nature Association, 134

Anadromous fish, 53, 55, 88, 116, 131, 133, 136–137, 190. Also see Fish, migration; and, Salmon

Anchorage, 200, 205, 207, 209–210, 220, 222, 229–230; earthquake, 1964, 225; harbor, 210

Anchorage *Daily News*, 220

Anchorage *Daily Times*, 230

Anderson, Darwin K., 186

Anderson, Jack, 230

Andrus, Cecil, 189, 224

Angell, Homer, 99, 104, 107, 134

Ansley, John, 174

Antiquities Act, 1906, 171
 Appaloosa Dam, 165
 Applegate Dam, 150, 156–157
 Archaeological and Historical Preservation Act, 1974, 171, 175
 Archaeology: Bonneville Dam, 171, 173–175; cultural sites, 171; Marmes Rockshelter, 173–174
 Arlington, 141, 167
 Arnold, Harvey L., 168
 Arrow Lakes, 139
 Association of Northwest Steelheaders, 154, 186, 191–192
 Asotin Dam, 150, 155, 164, 166, 191
Asotin, Steamer, 23
 Astoria Chamber of Commerce, 56
 Atlantic Richfield Company, 183, 229
 Atomic Energy Commission, 212, 223, 227–228
 Audubon Society, 154, 192

B

Baker, Charles, 107
 Ballard Locks, 55
 Banker, E. F., 85
 Barden, W. J., 28, 75
 Bashore, Harry, W., 41–42
 Beaufort Sea oil wells, 232
 Bell, Milo, 55
 Belloni, Robert, 171
 Ben Franklin Dam, 150, 153–154, 160, 166
 Bessey, Roy, 63, 164–165, 205
 Biggs, John A., 186
 Black, Clark, 73
 Black, W. M., 28
 Black Eagle, Joseph, 131, 170
 Boeing Field, 102
 Boise Cascade Corporation, 157
 Boise River, 89–91, 142
 Blood, Henry, 55
 Bone, Homer, 182
 Bonners Ferry Wildlife Federation, 132
 Bonneville Dam: 2, 46, 52–53; archaeology, see archaeology of Cultural sites; authorization, 52–53; construction, 64–65; fish hatchery, 130; fish passage, 53–54, 133–134, 137, 141; flood control, 63; hydropower, 65–67; military camouflage, 102, 107; power rates, see Columbia River, power rates; second powerhouse, 163, 167, 169, 171, 175; visitors center, 134

Bonneville Power Act, 67
 Bonneville Power Administration, 62, 66–67, 72, 76–78, 84, 89, 92, 104, 106–108, 135, 139, 164–167, 170
 Borah, William, 26
 Boundary Waters Treaty, 138
 Bradley Lake Project, 210, 222–223, 229
 Bridgeport, 167
 British Columbia, 139–140
 Brooks, A. H., 201
 Brown, Lytle, 38–39, 41–42, 50, 52, 85
 Bruce's Eddy, *see* Dworshak Dam
 Bullard, Oral, 138
 Burton, Theodore E., 9
 Butler, John, 33, 35–42, 49–50

C

California Debris Commission, 84
 Camas Prairie Railroad, 174
 Canadian Treaty, *see* Columbia River Treaty
 Canal Flats, 139
 CANOL (Canadian Oil Line), 103–104, 228–229
 Carson, Rachel, 150
 Cascade Mountains, 3, 10, 11
 Cascade Rapids, 2, 13–15, 51
 Cascades Canal and Locks, 12–14, 16, 84
 Cassidy, William F., 144, 164
 Catherine Creek Dam, 171
 Cavanaugh, James B., 12, 25, 27
 Cayuse Indian Tribe, 168, 172
 Celilo Falls, 2, 13, 16, 72–74
 Chamberlain, George, 9, 27–28
 Chena River, 213; flood project, 225–227, 231
 Chena Slough, 225
 Cheney, S. A., 25
 Chief Joseph Dam, 105, 107, 121, 131, 165–167, 170, 185
 Church, Frank, 189
 Citizens League for Emergency Action on the Rogue, 157
 Clark, Allen J. Jr., 219
 Clark Fork River, 2, 89, 106
 Clarke, Frederick J., 150–154, 173, 183, 185, 193, 222

Clearwater River, 3, 16–17, 90, 115, 121, 131, 143,
 Coeur d'Alene Lake, 34, 41
 Cole, Phillip L., 138
 Columbia and Okanagan Steamboat Company, 17
 Columbia and Snake River Waterways Association, 26
 Columbia Basin: 13, 17; irrigation, 28–29, 34, 36, 38–42, 50–52, 65, 77; hydropower, 26, 49–52; power markets, 49–52, 64–66; power rates, 122–123; problem studies, 114, 118, 120–123; reclamation, 25, 28–29, 33, 36–39, 40–42; surveys, 37–42
 Columbia Basin Interagency Committee: 41, 62, 64, 106, 116–117, 120, 123, 135–136, 164; Fish and Wildlife Committee, 116
 Columbia Basin Irrigation League, 34, 38, 40–42, 49–50
 Columbia–North Pacific Study, 164
 Columbia River: Canadian storage, 139; fish conservation, 131, 168; fish passage, 51, 53, 55–56; flood control, 84–85, 88–91; floods, 84; hydropower, 25–26, 28, 49, 51–52, 104, 107; improvements, 13–14, 17, 34; irrigation, 165; mouth of, 2, 8–9, 12, 14; multiple use, 25, 29, 50–51, 88–89, 105–106, 118–120, 132; navigation, 8–9, 12–16, 28, 50, 53–55, 73, 75, 104, 107, 154–155, 164; power markets, 26, 49, 51–52, 64–65; power rates, 56, 64, 66–67; streamflow, 164–165; surveys, 13–14, 17, 39–43, 86, 106, 115, 118, also see individual House Documents and Columbia River and Tributaries Review Study; tributaries, 13, 29; Upper Columbia River Project, 27, 38, 93, 154–155; also see Ben Franklin Dam; water resources planning, 106, 153–157
 Columbia River and Tributaries Review Study: 1962, 154, 156; Plan of Survey, 1973, 170; 1977 report, 165–166, 170; Inventory of Problems and Areas of Concerns, 1973 and 1974 reports, 166, 170; public meetings, 1972, 157, 164–165
 Columbia River Conservation League, 154
 Columbia River Development League, 49
 Columbia River Development Treaty, 92
 Columbia River Fisherman's Protective Union, 54
 Columbia River Gorge, 51, 67
 Columbia River Power Project, 27
 Columbia River Treaty, 140
 Columbia Storage Power Exchange Corporation, 140
 Columbia Valley Association, 49, 73, 86
 Columbia Valley Administration, 122–123
 Columbia Valley authority, 66, 114, 121–122,
 Colville Confederated Tribes, 170, 172
 Colville Indian Association, 169
 Conover, Nelson, 93, 192–193
 Cook Inlet, 222–223, 229, 231
 Coos Bay, 10–11
 Copper River, 3, 201, 209, 211
 Cordova, 211, 228
 Corps of Engineers, Alaska District: 100, 103, 107, 158–159, 200–201, 206–209, 222–223; Arctic studies, 231; environmental impact statements, 230–233; environmental studies, 231–232; fish and wildlife mitigation, 220; labor shortages, 207–208, 231; military clean-up, 233; military construction, 100, 102–104, 200, 206–208, 221–222, 228; oil pipelines, 228–231; power markets, 218–219, 221, 223–224; surveys, 200, 202, 204–206, 208–213, 218
 Corps of Engineers, Board of Engineers, 10, 12, 14, 25–26, 34, 38, 42, 48–55, 73–77, 84, 86, 106, 156, 210–213, 223

Corps of Engineers, Bonneville District, 77, 96, 101, 107

Corps of Engineers, Chief of Engineers, 9, 11, 15, 24-28, 35-36, 38, 41-42, 50-53, 55, 76-77, 84, 87, 90, 120, 222-223, 130, 134, 136-139, 142, 150-152, 164, 170, 174, 182, 186, 193, 205, 208, 210-213, 220-222, 231

Corps of Engineers, Juneau District, 100, 200, 202, 204

Corps of Engineers, Mountain Division, 101

Corps of Engineers, North Pacific Division: 1-2, 24-27, 34-35, 39, 42, 48, 66, 75, 84-86, 89, 91-92, 96, 114, 122, 130, 139, 142, 144-145; dredging, see permit program below and water quality; environmental planning, 152-159; environmental impact statements, 151, 157, 184, 192; fish and wildlife mitigation, 172, 184-194; fish research, 150-152 ; interagency relations, 40-41, 49, 63, 89; military construction, 100-104, 151; power studies, 165-166; power market studies, 64-65; public relations programs, 158; permit program, 182-183, 230-232; resource planning, 62; salvage archaeology, 171-172, 174-175

Corps of Engineers, Pacific Division, 1, 25, 35, 42, 45, 95, 100-101, 106-107,

Corps of Engineers, Portland District, 1, 8, 12, 35, 38-39, 74-75, 85-89, 95, 101, 105, 114-117, 120, 141

Corps of Engineers, Seattle District, 2, 28, 33, 35, 37, 42, 88, 95, 100-104, 116, 142, 170, 200, 202-206, 209, 221, 225-228

Corps of Engineers, South Pacific Division, 42, 101

Corps of Engineers, Walla Walla District, 90-93, 96, 100, 123, 130-132, 137, 143, 165-166, 169, 172-175, 183, 185-187, 190-194

Corps of Engineers Waterways Experiment Stations, 159

Cottage Grove Dam, 87

Cougar Dam, 86, 131

Council on Environmental Quality, 151-152

Cox, Donald, 187

Cramton, Louis C., 40

Crater Lake, Alaska, 221

Crookham, George, 164

D

Dalles-Celilo Canal, 13-16

Dam Safety Act, 1976, 91

Dana, Marshall, 23, 29, 52, 62-63, 66, 72, 75

Daugherty, Richard, 172-174

Davidson, C. Gerard, 122

Day, L. B., 186-188

Deakyne, Herbert, 38-39

Debelius, Charles A., 231

Deschutes River, 2, 27-28

Detroit Dam, 86, 106

Devil Canyon Dam, 223-224

Diefenbaker, John, 140

Dill, Clarence, 35, 41, 52-53

Distant Early Warning System, 211

Dodson, William B. D, 50, 53, 64–65, 67

Dondero, George A., 78

Dorena Dam, 87, 142

Dredging, 182–184

Dunn, Beverly, 101

Dworshak Dam, 131–132, 137, 143, 165, 174; fish and wildlife mitigation, 131–137; fish hatchery, 137, 185, 187, 194; powerhouse, 167; re-regulating dam, 164, 166–167; salvage archaeology, 174

E

Eastwick, Philip G., 11

Eisenhower, Dwight D., 114, 123–124, 140

Eklutna Dam, 222

Elk Creek, 10

Elk Creek Dam, 157–158

Elliot Bay, 13

Evans, Dan, 155–156, 174, 184, 191

Environmental Advisory Board, 150, 153–155

Environmental Guidelines, 151, 153–154

Environmental Impact Statements, 150–152, 157–158, 165, 167

Environmental movement, 150–151, 154, 157–158, 164, 168, 170, 192

Environmental Protection Agency, 183–184, 186–187, 191

Exxon, 232

F

Fagan, John, 175

Fairbanks: 201, 203–207, 209, 213; 1967 Flood, 222, 225–227, 231

Fairbanks *Daily News Miner*, 219–220

Farrell, Carl Y., 213, 218

Federal Bureau of Commercial Fisheries, 185–186

Federal Emergency Relief Appropriation Act, 1934, 86

Federal Inter-agency River Basins Committee, 64, 106, 116, 121, 135

Federal Power Commission, 25, 29, 66, 73, 89, 95, 106, 131, 165, 171, 221–222

Federal Waterpower Act: 1920, 25

Federal Water Project Act: 1965, 143

Fern Ridge Dam, 87, 142

Fernald, Gordon, 64, 120

Fero, James, 224

Finley, William L., 134

Fish: conservation, 53–56, 87, 130–133, 136, 184–185, 189; fish kills, 137–138, 185–188, 190; fish passage, 24, 48, 51–56, 182, 191–192, 211–213; fishways, see fish passage; hatcheries, 133, 135, 137, 182, 185–186, 188, 192–194; migration, 136–137, 173–174, 186–188, 190–193; mitigation, 131, 137, 157, 181, 184–185, 191–194; permits, 54; research, 136, 184–193

Fish and Wildlife Coordination Act, 137, 157–158, 182, 185, 192, 194
 Fish and Wildlife Service, 115, 117, 119, 135–138, 154, 211, 213, 220, 224
 Fishbowl planning, 151–152, 154, 156–157
 Fisheries Engineering Research Program, 116, 136, 184, 190
 Fisk, Walter L., 14
 Flood control: 76, 84, 93, 95; 1934 conference, 85–86, 89; surveys, 85–86, 89
 Flood Control Act: 1936, 8, 84–86; 1937, 86; 1938, 87; 1944, 116, 120, 142; 1948, 208; 1958, 226; 1960, 92; 1962, 157, 221; 1970, 164
 Flood control benefits, 84, 89, 91
 Flood fighting, 84, 90–93, 225–227
 Flood Plain Information Reports, 92
 Flood Plain Management Service, 84, 92
 Floods: 8, 84, 89–90, 92, 138–139, 225–227
 Foote, Louis, 93–97, 124, 129–133
 Ford, Gerald, 93
 Ford, Sam, 106
 Fort Greely, 228
 Fort Lewis, 101
 Fort Richardson, 210
 Fort Seward, 100
 Fort Stevens, 99–100
 Fort Wainwright, 208
 Fort Worden, 101
 Fort Yukon, 200–201, 212
 Foster, Addison, 28
 Foster Creek Dam, *see* Chief Joseph Dam
 French, Burton, 26
 Friends of the Earth, 165, 184
 Fryxell, Roald, 173
 Fulton, Charles, 9

G

Gaillard, D. D., 202
 Gardner, Warner W., 116
 Gault, Homer, 34
 General Dam Act, 1906, 24; 1910, 24–26
 Giesen, Robert, 172–175, 191
 Gill, Roy, 40–41, 50
 Gillespie, George L., 9, 11, 14, 28, 54

Geothals, George, 34
 Glacier National Park, 119–121, 133
 Glacier View Dam, 119–121, 133
 Goerz, Peter P., 205
 Good, James, 40
 Grand Coulee, 28, 34, 42
 Grand Coulee Dam: 42, 48–53, 55, 61; authorization, 42, 48, 50, 62, 73–76; construction, 56, 72; flood control, 63, 91, 119; hydropower, 64, 66, 104, 106; power markets, 66, 107; powerhouses, 155, 164–166
 Gravel, Mike, 224
 Grays Harbor, 11–12, 104, 159, 182, 184
 Grey, Zane, 157
 Great Northern Railroad, 11
 Green Peter Dam, 86, 131, 143
 Gribble, William C., 197, 208, 231
 Grimm, C. I., 50
 Griswold, Harry W., 78
 Gros Ventre River, 91
 Gruening, Ernest, 218, 220
 Gulf of Alaska, 202

H

Habersham, Robert A., 11
 Hagerman National Fish Hatchery, 194
 Hammel, Jay, 224
 Hanburger, Christian, 212, 219, 224, 229
 Handbury, Thomas H., 14
 Hanford Project, 102, 166
 Hannum, Warren T., 101, 106
 Hardy, Conrad P., 102
 Harts, William W., 15, 17
 Hatfield, Mark O., 93, 166
 Hatway Creek, 174
 Hells Canyon: 2, 16–17; dams, 117, 120–121, 130–133, 135, 164–165; project, 114–121, 131–132
 Hemphill, Jack, 191
 Hermann, Binger, 14
 Heyburn, Weldon, 26
 Heuer, William Henry, 1, 2, 9–10, 15, 35, 202
 Hickel, Walter J., 220, 224
 High Mountain Sheep Dam, 131

Hill, Knute, 66, 76–78
 Hill, Samuel B., 42
 Hiram M. Chittenden Locks, 11
 Historic Sites Act, 1935, 171
 Hodel, Don, 140
 Holmes, Harlan, 55–56
 Homer, Alaska, 225
 Honeyman, Nan Wood, 77
 Hoover, Herbert, 34, 42, 50, 52
 Hoover Commission, 114, 123–124
 House Committee on Rivers and Harbors, 1939 Hearings, 77–78; 1941 Hearings, 104, 134; 1944 Hearings, 107
 House Document 103, “Columbia River and Minor Tributaries,” 1933, 51, 55, 75
 House Document 190, “Snake River and Tributaries,” 1933, 74–75
 House Document 308, “Estimate of Cost of Examinations, etc., of Streams Where Power Development Appears Feasible,” 1926, 29, 34, 36, 89
 House Document 704, “Report on Reexamination of Columbia and Snake Rivers,” 1938, 75, 77, 107, 116
 Hungry Horse Dam, 106
 Hurley, Patrick, 41, 52
 Hyde, Arthur M., 51
 Hydroelectric Power Development Act, 1976, 224
 Hyzer, Peter C., 143, 220–221

I

Ice Harbor Dam: 115, 121, 131–132, 167, 186–187, 190–192; salvage archaeology, 172–174
 Ickes, Harold, 53, 56, 77, 89, 115–116
 Idaho Fish and Game Department, 171
 Idaho–Oregon–Washington Hells Canyon Association, 132
 Idaho Outdoor Association, 132
 Idaho Power Company, 131
 Idaho State University Museum, 174
 Idaho Water Resources Board, 164
 Idaho Wildlife Federation, 132
 Indian Treaty Rights, 119, 131, 135, 168–172
 Inland Empire Maritime Conference, 53, 75
 Inland Empire Waterways Association, 53, 75–77, 107, 133, 154–155, 158, 164, 190
 Inland Waters Commission, 24–25
 Inland waterway, 13–14, 17, 72, 74, 77, 150, 189
 Inland Waterways Corporation, 74
 Institute for Water Resources, 150

Inter-Mountain Alpine Club, 154
International Columbia River Engineering Board, 139
International Joint Commission, 138–139
Interstate Fish Conservation Committee, 55
Itschner, Emerson C., 130–132, 136, 208
Izaak Walton League, 157

J

Jackson, Henry, 189, 227
Jackson Hole, 84, 91, 94
Jadwin, Edgar, 35–36, 38, 40
John Day Dam, 73–74, 130–131, 133, 138, 141, 143, 170; mitigation, 172; nitrogen supersaturation, 185; salvage archaeology, 172–174
John Day River, 2, 26
Johnson, Lyndon B., 138, 140, 221, 226
Jones, A. B., 88–89
Jones, Wesley, 35, 37–38, 42, 52
Jones, William, 54
Jordan, Len, 139, 164, 174
Jordan, Robert E. III, 150
Juan de Fuca Strait, 3, 8–9

K

Kaiser Aluminum Corporation, 117, 139, 223
Kelley, Roy S., 143, 149, 151–154, 156–159, 173–174, 185–186, 191–193, 217, 222–223
Kenai Lake, 211
Kenai River, 231
Kennedy, John, 140
Ketchikan Harbor, 206–207
Kieffer, Pierre V., 218–219
King County, Washington, 153
Kingman, Dan C., Dredge, 182
Kipp, R. H., 49, 72–73, 86–87
Klondike, 11, 201
Kootenai River, 2–3, 90, 130, 139, 142
Kootenai Valley Associated Drainage Districts, 139
Korean Conflict, 206
Kreiger, Herbert, 171
Krug, Julius A., 114, 121–122
Krug–Royall Agreement, 121, 123

Kuentz, Oscar, 49–50, 55, 74, 86

Kuskokwim River, 2–3, 209, 212

L

Ladd Field, 206, 226

Lake Union, 13

Lake Washington Ship Canal, 11, 13

Langfitt, William C., 9, 15

Lankhorst, J. J., 150

Lapsley, William W., 140, 213, 225

Lee, John C. H., 63–64, 67, 76, 89

Leonhardy, Frank C., 174

Leow, E. A., 64

Lewis, John H., 27, 36, 139

Lewis, Oliver, 90, 116, 132

Lewis and Clark Expedition, 1

Lewiston, Idaho, 3, 13–18, 23, 26, 28–29, 136

Lewiston Commercial Club, 26

Lewiston, Steamer, 23

Lewiston Water and Power Company, 18

Libby Chamber of Commerce, 139, 141, 166

Libby Dam, 131, 133, 137, 139–143; powerhouse, 165–166; re-regulating dam, 166

Lindley, Hervey, 38

Little Goose Dam, 143, 172, 185–187

Long Lake, Alaska, 221

Lookout Point Dam, 86, 142

Lost Creek Dam, 150, 152, 157–158

Low Mountain Sheep Dam, 165

Lower Columbia Basin Audubon Society, 154

Lower Columbia River Fishery Program, 135

Lower Granite Dam, 78, 150, 164–165, 172, 174–175, 186, 189–192

Lower Monumental Dam, 65, 164, 169, 172–173, 185–187

Lower Snake River Fish and Wildlife Compensation Plan, 188–189, 192–193

Lower Snake River Project, 67, 72–75, 77, 189–190

Luce, Charles, 170

Lucky Peak Dam, 90, 121, 132, 142, 167

Lukesh, Gustave R., 33, 35–42, 50–51, 55, 64, 72–73, 75, 85

Lyons Ferry, Washington, fish hatchery, 194

M

Maass, Arthur, 123

Mackenzie, Alexander, 24–26
 MacDonald, Donald, 205
 MacDuffee, Karl, 117
 Magnuson, Warren G., 103, 122, 172
 Mains, Edward M., 137, 184–185
 Manhattan Project, see Hanford Project
 Mansfield, Mike, 138
 Markham, Edward A., 53, 56, 63, 65
 Marmes Rockshelter, 173–174
 Marshall, Arthur R., 163, 187
 Martin, Charles H., 52–53, 171
 Mathews, Amos C., 229
 McCall fish hatchery, 194
 McCall, Tom, 94, 187
 McConnell, Richard E., 94, 154, 166, 193, 221, 231
 McCormack, Mike, 167
 McKay, Douglas, 139
 McKinstry, Charles H., 54
 McNary, Charles, 48–50, 52–53, 56, 66, 73–77, 107, 134, 171
 McNary Dam, 51–52, 72–78, 86–87, 107–108, 116–117, 120, 124, 131, 135–136, 142, 150, 166–167, 169–172;
 second powerhouse, 166–167
 Mead, Elwood, 36, 40, 42, 52
 Meeds, Lloyd, 224
 Meldrum, D. H., 117
 Mendell, George H., 15
 Mica Creek Dam, 139
 Michler, Nathaniel, 13, 17
 Mid-Columbia Archaeological Society, 154
 Mid-Columbia River Association, 50
 Miller, Raymond, 65
 Millis, John, 28, 202–203
 Mississippi River Commission, 84
 Mitchell, John, 9
 Mitchell, Hugh, 121–122
 Mitchell, William (Billy), 100
 Moore, Cecil, 105
 Moose Creek Dam, 231
 Morris, John W., 193, 231
 Morrow, J. J., 27

Mott, James, 86
Mountain Sheep Dam, 117, 132
Mud Mountain Dam, 88
Muir, John, 24
Munsey, Tom, 227
Murphy, Charles, 123

N

NEPA, see National Environmental Policy Act
Nash, Wallis, 10
National Audubon Society, 154
National Environmental Policy Act, 1969, 150–152, 163, 171, 173, 186, 191, 229
National Flood Insurance Act, 1968, 92
National Historic Preservation Act, 1966, 171
National Industrial Recovery Act, 52–53, 62
National Marine Fisheries Service, 187–188, 194
National Oceanic and Atmospheric Administration, 184
National Park Service, 171–175
National Parks Association, 119
National Planning Board, 62–63
National Power Policy Committee, 78
National Reclamation Association, 75, 122, 151
National Register of Historic Places, 173, 175, 233
National Resources Board, 62
National Resources Committee, see National Resources Planning Board
National Resources Planning Board, 62–63, 65, 75, 77, 84, 89, 139, 204–205, 229
National Waterways Commission, 25, 170
National Wildlife Federation, 154, 220
Native Alaskans, 220, 229
Nelson, W. S., 53
Neuberger, Richard L., 64, 66–67, 169
Newell, Robert J., 120, 135
Newell–Weaver Agreement, 120–121
Newlands, Francis, 25
Newlands Act, 24–25
Nez Perce Dam, 117, 119, 131, 133, 136, 164
Nez Perce National Historic Park, Spaulding, Idaho, 175
Nez Perce Tribe, 131, 168, 170–172
Nitrogen Study Coordination Committee, 186

Nitrogen supersaturation, 138, 150, 155, 185–188, 190–191
Nixon, Richard M., 138, 150, 230
Nome: 199–200, 202, 206; harbor, 203–204
North Bonneville, 167–168
North Pacific Planning Project, 139
North Slope, *see*, Alaska, Arctic
Northern Pacific Railroad, 11
Northwest Power Pool, 92, 104
Northwest Regional Council, 104
Northwest States Development Association, 106
Northwest Steelhead and Salmon Council, 184
Norwood, Gus, 220
Nuclear Cratering Group, 228
Nuclear energy, 227–228
Nunn, Lee R., 232

O

Olson, Delbert E., (Deb), 151, 172
Olympia, Dredge, 8
Olympia Harbor, 184
O'Sullivan, James, 49
Open River Association, 23, 29
Operation Fish Run, 188, 193
Operation Foresight, 92
Oregon Department of Environmental Quality, 186–187
Oregon Environmental Council, 165
Oregon State Fish Commission, 56, 117, 133, 193
Oregon Pacific Railroad, 10
Oregon State Planning Board, 56, 87, 134, 182
Oregon Railway and Navigation Company, 13–14
Oregon Wildlife Commission, 157
Outdoor Recreation Resources Review Act, 142

P

Pacific Coast, 10–11, 13–14
Pacific Northwest Coordination Committee, 135
Pacific Northwest Development Association, 122
Pacific Northwest Regional Planning Commission, 61–67, 75, 85, 104
Pacific Northwest River Basins Commission, 62, 64, 164, 166

Pacific Northwest Utilities Conference Committee, 139
 Packwood, Bob, 166, 187
 Page, Myron, 91
 Palmer, Joel, 168
 Palouse River, 89
 Palouse Indians, 168
 Park, Richard, 101, 105–106, 114
 Partnership Policy, 124, 130–132
 Peace Arch, 138
 Pearson, Lester, 138, 140
 Peel, Wesley, 93, 166
 Pend Oreille Lake, 28
 Pend Oreille River, 34
 Pendleton *East Oregonian*, 74
 Penny Cliffs Dam, 132–133, 139
 Permafrost, 103–104
 Pick, Lewis A., 122
 Pick-Sloan Plan, 120
 Pierce, Walter, 53, 75–77, 86
 Pinchot, Gifford, 24
 Pillsbury, G. B., 42, 134, 202
 Pittsburg Landing, 17
 Pleasant Valley Dam, 132
 Point Barrow, 211, 227
 Pope, James, 66, 76
 Port Townsend, 101
 Portland, 7–18, 182
 Portland Canal, 202
 Portland Chamber of Commerce, 15–16, 50, 52–53, 64, 66, 73–74, 120
 Portland *Oregon Journal*, 52, 72
 Portland *Oregonian*, 9–10, 14, 53, 137, 158, 165,
 Portland, Sternwheeler, 191
 Potter, Charles L., 27–28, 55
 Potter, William E., 206–207
 President's Committee on Water Flow, 62, 66, 74
 President's Water Resources Policy Commission, 121, 136,
 Priest Rapids, 13, 16–17, 29
 Priest Rapids Dam, 55, 132–133, 154
 Prince William Sound, 230

Project Chariot, 227
Project Plowshare, 228
Prudhoe Bay, 217, 222, 228–229, 231–232
Public Works Administration (PWA), 48, 53, 77
Puget Sound, 3, 8, 11–13, 88, 100–101, 104, 184
Puget Sound Basin study, 164
Puget Sound Utilities, 139
Pumped storage, 166

Q

Quartz Creek Dam, 86

R

Rampart Advisory Committee, 220
Rampart Canyon, 3, 212
Rampart Canyon Studies, 219–220
Rampart Dam, 200, 212–213, 218–221, 224, 229, 231; fish passage 213
Raver, Paul, 106–107
Raymond, Charles P., 200–202
Raymond, Washington, 12
Reclamation Act, 1902, 26
Recreation, 141–144, 151, 155–158, 185, 190–193, 211–213, 231, 227
Rees, Thomas, 27
Refuse Act, 1899, 24, 54, 150, 158, 182
Reservoir Control Center, 84, 91–92
Reuss, Henry S., 150
Reybold, Eugene, 107
Richardson Highway, 203
Richland Rod and Gun Club, 154
Richmond, Henry, 165
Ririe Dam, 91
Rivers and Harbors Act, 1890, 24, 54; 1899, 230; 1906, 24; 1912, 25; 1925, 25, 34; 1933, 53; 1935, 53, 75
Robert, Henry M., 1, 9–11
Robertson, George, 224
Robins, Thomas M. 32, 42, 49, 50, 52–53, 61–67, 71–73, 75–78, 83, 85–89, 104, 120, 122, 133–135, 139, 226
Rocky Reach Dam, 131
Roessler, Solomon, 9, 26
Rogue River: 3, 10–11, 150, 152, 157; floods, 157; flood control project, 157
Rogue River Ecology Council, 158

Rogue River Flood Control and Water Resources Association, 157
Roosevelt, Franklin D., 48, 52–53, 56, 62, 73–77, 101, 106, 134, 164
Roosevelt Lake, 89–91
Roosevelt, Theodore, 24
Root, Elihu, 9
Roseburg, 10
Ross, James D., 66–67, 76–77, 133
Rossell, J. M., 25
Royall, Kenneth C., 114, 121, 123

S

Sadie B., Steamer, 14
Salt Lake City, 100
St. Michael: 200–202, 205; canal, 202
Salmon: fishing industry, 51, 53–54, 76, 119, 131–138, 171; fisheries, 53, 55, 135–136, 170, 182
Salmon River, 3, 117, 119, 131, 133
Salvage archaeology, see archaeology
San Francisco, 1, 8, 10, 42
Sargent, Howard L., 156
Sawyer, Kenneth T., 138, 144, 152, 157–158, 165–166, 170–171, 183–187, 220, 230
Scheufele, Roy, 50
Schley, Julian L., 76, 87, 89, 100, 182
Schultz, Edward H., 28
Seattle, 3, 11, 13
Seattle Daily Times, 47, 49
Seattle Post-Intelligencer, 192
Seth, Leroy L., 170
Seward, 225
Shepard, J. W., 107
Shingler, Don G., 124, 131, 139
Shoup, Dick, 138
Sierra Club: 152, 154–155, 165, 184–185
Simpson, Milward L., 91
Sinnott, Nicholas, 27
Skagit, Snagboat, 8
Smith, Addison T., 40
Smith, Charles, 42
Smith, George Otis, 26
Smith, Martin, 66

Snake River, Alaska, 203

Snake River, Idaho: description, 2; flood control, 89–90, 132; hydropower, 114–115; irrigation, 90, 132; Lower Snake River Project, 65, 72, 74–75, 104, 107, 117, 132, 154, 167; Middle Snake River Project, see Hells Canyon Project; navigation, 17, 26, 50, 75, 165; navigation improvements, 18, 26, 51, 73–75; power markets, 26, 74, 76–77; recreation, 67, 165; surveys, 17, 26–28, 34–35, 38, 74, 114–116; Wild and Scenic designation, 165

Snake River Basin, 114

Snake River Waterways Association, 26

Snettisham Dam, 158, 200, 218–223, 229

Snoqualmie River, 149, 155–157; floods, 155–156

Snohomish River, 155

Spokane Chamber of Commerce, 41, 139

Spokane Indian Tribe, 170

Spokane River, 2, 26, 28, 34–35, 153

Spokane, Steamer, 23

Spokane *Spokesman-Review*, 66

Spring Creek Fish Hatchery, 129, 137–138

Stanley, Lou, 116

Steiwer, Frederick, 50, 52, 66, 72–76

Stevens, Ted, 221, 231

Stevens, Issac, 168

Stimson, Henry, 115

Stoddard, Charles, 155

Sturdevant, Clarence Lynn, 42, 49–50, 205

Sturgis, Samuel D., 90, 93, 123, 130–132, 136, 139, 208, 213

St. Paul, Steamer, 203

Susitna Dam, 200, 220, 223–225, 227

Susitna River, 3, 210; Upper Susitna River Basin, 223–224

Summers, John, 38

Sundborg, George, 220

Sweet Home Dam, 86

Symons, Thomas, 7, 10–11, 13, 16–17, 89, 154

T

“308” Reports, see individual House Documents

Taft, William Howard, 25

Talkeetna River, 210

Talley, Benjamin B., 103, 200

Tanana River, 209, 212–213; flood control, 225–226

Tandy, Fremont S., 130–132, 170

Taylor, Harry, 17

Teller, Edward, 227
 Teton Dam, 91
 The Dalles: 2; Chamber of Commerce, 76; Port Commission, 76
 The Dalles Board of Engineers, 15
 The Dalles–Celilo Canal, 14–16, 25, 27–28, 73
 The Dalles *Daily Chronicle*, 14
 The Dalles Dam, 50–51, 73–76, 116, 131, 134, 136, 139, 167, 169
 Thermal energy, 166
 Thiry, Paul, 142
 Torbet, E. N., 117, 120
 Trans–Canada–Alaska Railroad, 205
 Treaty Tower, 140, 142
 Tri–State League, 75
 Tri–State Steelheaders Association, 190–192
 Triem, Paul, 187
 Truman, Harry S., 89, 114, 118, 121–123, 136
 Tudor, Ralph A., 116
 Twining, Nathan F., 199, 208–209

U

Udall, Stewart, 220
 Umatilla Dam, *see*, McNary Dam
 Umatilla Rapids, 16, 52, 72–73, 78
 Umatilla Rapids Association, 72, 74–75
Umatilla, Steamer, 23, 28, 71
 Umatilla Indian Tribe, 168, 170–172
 Umpqua River, 3, 10
 U.S. Atomic Energy Commission, 212, 223, 227–228
 U.S. Bureau of the Budget, 210, 219
 U.S. Bureau of Fisheries, 55, 134, 169, 185
 U.S. Bureau of Indian Affairs, 170, 174
 U.S. Bureau of Land Management, 137, 143, 157
 U.S. Bureau of Reclamation: 24, 26–27, 29, 33–34, 36–38, 40, 42, 65, 72–73; relations with Corps, 62–63, 65, 105, 132, 135–136, 139, 150, 157, 208
 U.S. Bureau of Sport Fisheries and Wildlife, 136
 U.S. Commissioner of Fisheries, 133, 168
 U.S. Department of Agriculture, 25, 34, 89
 U.S. Department of Interior, 25–27, 114–115, 123, 135, 166, 170–172, 183–184, 208, 211, 213, 219, 230
 U.S. Department of Natural Resources, 157, 164

U.S. Fish and Wildlife Service, 183–184, 191–194, 211, 213, 220, 224
U.S. Forest Service, 24, 194, 204, 209
U.S. General Accounting Office, 166, 175
U.S. Geological Survey, 1, 26, 34–36, 220, 226, 228
U.S. National Museum, 171
U.S. Quartermaster Corps, 100–101
U.S. Signal Corps, 100
Upper Snake River Valley, 84

V

Valdez, 203, 209–211, 225, 228, 230–231
Vanport flood, 84, 89, 113, 117–118
Veatch, John C., 56
Vietnam, 229

W

Walla Walla Chamber of Commerce, 158
Walla Walla Tribe, 168, 172
Walsh, Orville, 87, 117, 130
Walter, W. F., 41, 52
War Manpower Commission, 101
War Production Board, 105–107
Wardman, George, 201
Warm Springs Tribe, 170, 172
Warrendale Dam, *see* Bonneville Dam
Washington State Department of Ecology, 154–156, 171
Washington State Department of Fisheries, 117, 119, 181–182, 184
Washington State Department of Game, 186–187, 190, 193
Washington State University, 172–174
Washington Water Power Company, 34
Watana Dam, 224
Water Coalition Review, 224
Water Pollution Control Act, 1972, 150, 182
Water Project Recreation Act, 143
Water quality, 151–153, 157, 182, 185–188, 192–193
Water Refuse Act 1899, *see* Refuse Act
Water Resources Development Act, 1974, 167
Weaver, Jim, 157
Weaver, Theron D., 77, 104, 107, 113, 120–121, 135, 182

Wells, Philip P., 27
 Wells, Richard M., 92, 167–168, 181, 194
 Wenatchee *Daily World*, 49
 Wenatchee River, 155
 West, Frank H., 10–11
 West, Herbert, 75, 133
 Western Defense Command, 101–102
 Western Inland Waterways Corporation, 74
 Whipple, William H., 123, 169
 White, Compton, 77, 107
 Whittier, 206–207, 211
 Wilbur, Ray Lyman, 41
 Wild, Herbert J., 226
 Wildlife: conservation, 118, 120, 122; mitigation, 131–138, 141, 185, 192–194; research, 150, 154, 157–158
 Wiley, A. J., 33
 Willamette Falls locks, 8, 55, 86
 Willamette River: 2–3; fisheries, 133–134, 143; floods, 8, 83–84, 87; flood control, 84–89; navigation, 8, 28; navigation improvements, 8, 10, 72–73; surveys, 85–89, 92; water quality, 185
 Willamette River Basin Commission, 87
 Willamette River Basin Study, 164
 Willamette Valley Project Committee, 87
 Williams, Charles F., 75, 85
 Williamson, Robert S., 1, 10–11
 Willapa Bay, Washington, 11–12
 Willow Creek: dam, 92–93; 1903 flood, 84
 Wilson, Woodrow, 25
 Wind power, 166–167
 Withdrawal Act, 1910, 26
 Woodruff, Mark, 36, 41
 Woods, Rufus, 49–50
 World War I, 203–204
 World War II, 72, 102, 104, 107, 182, 200–201, 205, 213, 233
 Wrangell Narrows, 202, 206

Y

Yakima Indian Tribe, 168, 170–172
 Yates, Elmer P., 164, 185, 222, 226, 228
 Yellowstone National Park, 2, 91
 Yould, Eric, 224–225
 Yukon Power for America, 220
 Yukon River: 2–3, 200–205, 218, 220; hydropower, 218–219; surveys, 212–213

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